

A WEEKLY JOURNAL OF PRACTICAL INFORMATION IN ART, SCIENCE, MECHANICS, CHEMISTRY AND MANUFACTURES.

Vol. XI.—No. 26.
(NEW SERIES.)

NEW YORK, DECEMBER 24, 1864.

\$3 PER ANNUM
(IN ADVANCE.)

Lathe Attachment for Centering and Squaring.

The importance of well-prepared centers for a successful lathe job has been noticed in previous numbers of the SCIENTIFIC AMERICAN. We here illustrate a simple device for this purpose, which is used and highly recommended by some of our best mechanics. Ordinarily, several manipulations are required before shafts or studs are ready for turning. This machine, by one movement, centers, drills, countersinks and faces the work in the time required by the old method for each of those operations. The work is done accurately, and the machine can be managed by a boy or common workman. It adjusts itself to any size, without any alteration; is equally adapted to round, square or flat bars; cuts them to a uniform length, if required, with or without centers, and mills the ends for screws. It can be applied to any engine or drilling lathe, and attached or detached as readily as the foot-stock. The advantages claimed by its inventor are: simplicity and durability of construction, ease of management, saving in time, labor and power, and that work otherwise disagreeable is made pleasant.

Fig. 1 gives a perspective view of the attachment, showing the sliding jaws, N O. for holding the work firmly and centrally to the drill and cutters, by means

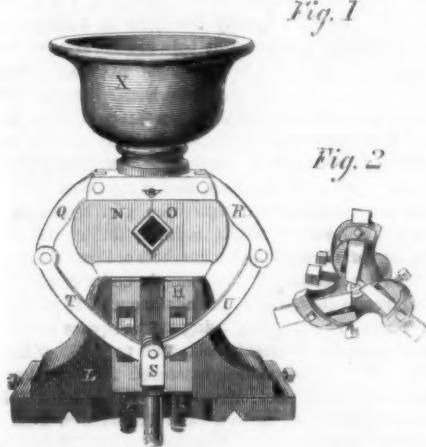


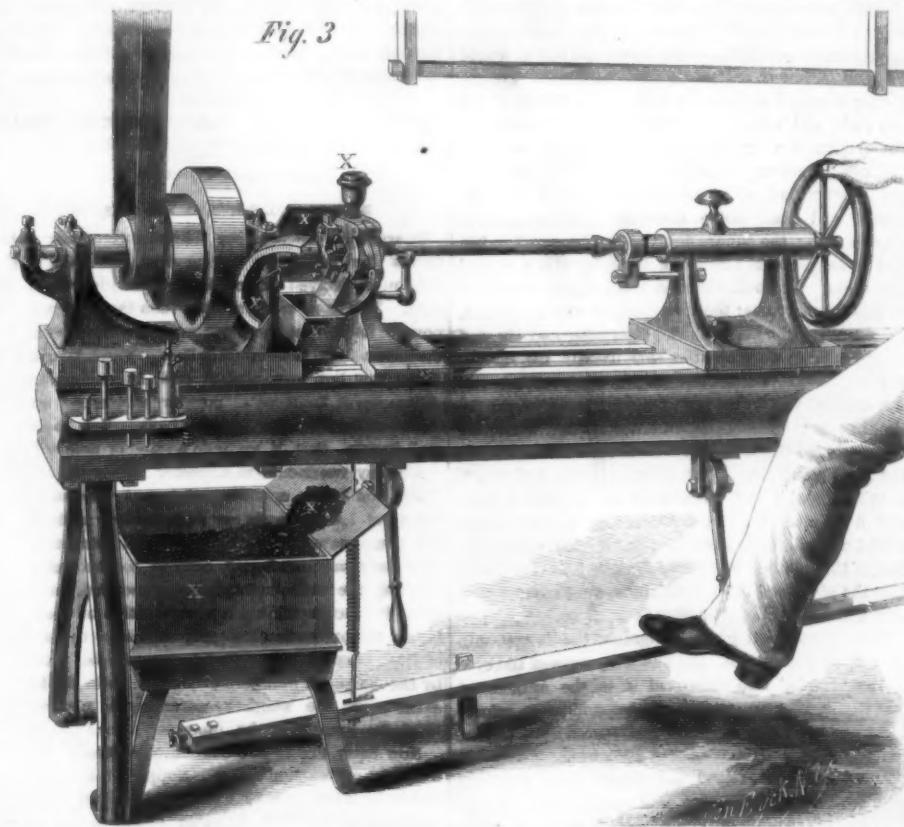
Fig. 1

Fig. 2

Reclamation.

In a recent number of the SCIENTIFIC AMERICAN it was stated that Prof. Tyndall, in a late lecture before the Royal Institution, had attributed to Mr. Joule the discovery of the disturbance of molecular forces by magnetism, when, in fact, the discovery was made and published in *Silliman's Journal*, by Prof. Chas. G. Page, of Washington, several years before the experiments of Mr. Joule. Turning to Prof. Tyndall's book of lectures on "Heat as a mode of mo-

brushes, buttons, sewing cotton, pocket knives, steel pens, postage stamps, pipes, sirups, lard, bologna sausage, pepper, pants, socks, shoes, looking-glasses, combs, tape, pins and needles, paper, lead pencils, tobacco, snuff, family soap, smoked beef, corn meal, mustard, vests, hats, handkerchiefs, towels, clothes, brooms, thread, scissors, envelopes, pen knives, cigars, crushed sugar, butter, beef tongues, nutmegs, table salt, salt fish, pickles, dried fruit, apples, crockery, crackers, sauces, lemons, matches, glass



NEWELL'S LATHE ATTACHMENT FOR CENTERING AND SQUARING.

of the levers, R T, connected by the rod, S, to a treadle beneath the lathe, operated by the foot. The part, H, is adjusted perpendicularly, and the chocks, L, horizontally, by set screws.

Fig. 2 shows the cutter and drill-holder, which is attached to the rotating spindle.

Fig. 3 is a fac simile of the attachment at work, as placed on a drilling lathe. For some time past one of them has been doing all the centering and squaring in the extensive machine works of Messrs. P. Whiting & Son, Whitinsville, Mass.

The operation will be readily understood by mechanics. The parts, X, are convenient arrangements for applying and saving oil.

For machines, State rights, the entire right, or further information, address the patentee, N. F. Newell, Whitinsville, Worcester Co., Mass., care of P. Whiting & Sons. Date of patent Jan. 29, 1861. See advertisement in next issue.

THE ironclads in the James river have been provided with a large sized locomotive lantern, which is placed on the bow. Its rays thrown ahead on the water enable the men to see if the rebels send down internal machines, or make any attempt to board them.

tion," page 117, we find him chargeable with another anachronism, more decidedly erroneous, in the record of scientific discoveries. The discovery of the vibration of "Trevelyan's bars," by Galvanism, and also the continuous rolling of metallic cylinders upon rails by the same agency, is ascribed by Prof. Tyndall to George Gore, Esq. Mr. Gore first made his experiments before the Royal Society, June 3d, 1858, and published the same in the *Philosophical Magazine* for June, 1858. More than eight years before, this same discovery was announced by Prof. Page in *Silliman's Journal* for January, 1850, together with illustrations of some interesting applications in the way of the *physique amusante* growing out of this discovery.

What may be sent to Prisoners of War by their Friends.

The United States will forward to its prisoners of war in the South the following articles:—Uniform hats, uniform caps, uniform coats, uniform jackets, flannel shirts, drawers, bootees, stockings, blankets (woolen), blankets (gum), commissary stores. The friends of the United States prisoners of war confined in the South are permitted to forward to them, by flag truce boat or other authorized channel, the following articles:—Coats, underclothes, caps, suspenders,

ware, cheese, vegetables, nuts, yeast, powder, tin-ware, meats and fish in cans.

All articles for prisoners of war will be forwarded to Col. John E. Mulford, agent for exchange of prisoners of war at Fortress Monroe, Va.

By order of the SECRETARY OF WAR,
E. D. TOWNSEND, Assistant Adjutant General.

NOTICE TO SUBSCRIBERS.

Hereafter, until further notice, the price of the SCIENTIFIC AMERICAN will be as follows:—When sent by mail, \$3 per annum; \$1.50 for six months; \$1 for four months. When delivered in the city by carriers, \$4 per annum. Single copies at the publication office and at periodical stores, 8 cents each. The postage on the paper by mail is 20 cents a year, payable quarterly in advance at the post office where received.

SCENTED SMOKING TOBACCO.—Cascarilla bark imparts a pleasant odor to tobacco. The scent is like musk, and is to be preferred to the rank and bitter fumes of common tobacco. With cascara bark in a pipe may be smoked in any apartment without offense. A piece as big as a pea is enough to put in one pipe full, but manufacturers grind the bark and mix it with the tobacco.

FAILURE OF THE ENGLISH IRON-CLADS.

The following article appears as a leader in the *London Mechanics' Magazine*, the best mechanical paper, with the soundest engineering views, published abroad:—

"The event foreshadowed in the *Mechanics' Magazine* more than two years since, is close at hand. The fleet of experimental iron-clads, of which the *Warrior* is the type, must, if they are to be in a condition to cope with the armor-plated ships of foreign powers, be reconstructed. What a bitter sarcasm is this announcement on Admiralty management. The *Warrior* has been held up to the admiration of the naval world as the most perfect specimen of a screw iron-clad frigate. Quite recently, it was represented on Whitehall authority, that 'her excellent sea-going qualities and rate of speed under steam were univalued,' and she was 'just in such splendid order in all her internal arrangements as can only be attained by unremitting exertions at the close of an ordinary term of commission.' It seems incredible that this magnificent vessel, which, we are told, the Admiralty officials 'feel a just pride in calling the finest and fastest of her Majesty's iron-clad fleet,' is suddenly discovered to be utterly defenseless as a ship of war.

"We were prepared for this discovery. Whilst she was still under construction we pointed out that the unprotected condition of her bows and stern would be fatal to her in action, as it would enable a completely armored antagonist to make a wreck of her two ends, and in her crippled state leave her no choice but destruction or surrender. Representations to that effect were urged on the notice of the Admiralty but disregarded with sublime indifference by 'my Lords' and their noble secretary. Remonstrance was in vain; the square fighting-box, occupying 200 feet in length of the center of the ship, was a capital invention. The batteries and the gunners were safe in this iron fortress: the arrangement was perfection, nothing could be better. The Controller and his staff were jubilant; they treated with disdain the sinister predictions of professional and civilian critics, and not content with one experimental iron-clad on the fighting-box system, costing nearly half a million, they induced the Admiralty to order three others on the same principle. Four ships, at a cost of nearly a million and a half were built on an untried plan, and now, after their completion, by a trial, which might and ought to have been made long before the first of the number was ready for sea, it is discovered that the objectors, whose opinions were treated with scorn, are right, and the plan is a failure.

The recent shell practice against the target-ship *Alfred*, at Portsmouth, has suddenly opened the eyes of the 'Lords,' who witnessed it, to the unpleasant fact that a *Warrior* with her bows and stern unprotected by iron armor would be no match for a *Gloire*, much less for a *Couronne* or a *Magenta*.

"A panic has seized the Controller of the Navy and his Chief Constructor, and spread to the Board. The fear of Parliament is before their eyes. Hastily, 'the *Warrior* is to be paid out of commission, and is ordered to be thoroughly dismantled, everything being returned to store and her machinery taken to pieces.' Three reasons are spoken of as having influenced the Admiralty in paying her out of commission:—'First, want of men for the three-decker *Victoria*; secondly, the defective condition of the ship's boilers; and, thirdly, the intended alterations and continuation of the armor-plating around the bows and stern.' The first two reasons are mere pretenses—the last is the true one. At length the murder is out. The famous *Warrior*, the splendid iron-clad, cannot meet an enemy without being doomed to destruction and without disgracing England's flag. The remedy is a bitter pill for the Government to swallow; but there is no avoiding it. *The Warrior must be reconstructed*; and this will commence the reconstruction of our entire iron-clad navy. The *Warrior* or elastic system of armor plating—iron on wood backing—which, with slight modification, is adopted for every plated ship, as we have frequently shown, is defective in principle, and must be replaced by a system of greater rigidity. The expense will be enormous, but it is unavoidable.

"The intended alteration to the *Warrior's* bow and stern will necessitate the opening and lengthening of the ship's frame forward and aft, otherwise she

would be unable to carry the additional armor plating, and would be ruined in her present excellent sea-going qualities and speed. In plain words, it is found necessary to cut the *Warrior* into three parts and reunite them by splicing (to use a familiar term) at both ends. This work will necessitate the removal of the armor plates and backing at the two extremities of the ship, the reconstruction and replating of the latter, and probably alterations in the masting and rigging. These changes will involve great expense, and may be seriously prejudicial to the trim of the vessel. Three other iron-clads on the same plan will have to be reconstructed.

"But worse still remains to be told. What is to be done with Mr. Reed's fleet of wooden bottoms and unprotected ends, carrying square iron fighting boxes on the *Warrior* plan, but with such instability of structure that the iron top sides vibrate alarmingly from the fire of the ship's guns, with armor that will hardly resist 68-pounders at short ranges, and with the hamper of movable bulkheads on deck? If the formidable *Warrior* cannot encounter an enemy without being reconstructed, what is to become of the ships of the *Research* and *Enterprise* class, of which eight were built or laid on the stocks before one was tried? They have neither strength nor speed, are neither liners nor cruisers, and cannot by any process of reconstruction be converted into serviceable craft. With these prospects before us, the condition of the navy is by no means satisfactory."

FURTHER EXTRACTS FROM PROFESSOR TREADWELL ON HOOPED CANNON.

[Concluded from page 389.]

EFFECT OF LIGHT AND HEAVY SHOT.

In artillery practice, the restraining power which causes the powder to act against the walls of the cannon is derived principally from the inertia of the shot. This is so much greater than the inertia of the powder itself, that the latter may be neglected in the considerations that are to follow. Now, bearing in mind what has been already said, let us compare the difference of the force of powder as exerted upon a small and a large gun respectively. It is perfectly well known, that, if we have a pipe or hollow cylinder of say two inches in diameter with walls an inch thick, and if this cylinder will bear a pressure from within of 1,000 pounds per inch, another cylinder, of the same material, of ten inches in diameter, will bear the same number of pounds to the inch if we increase the walls in the same proportion, or make them five inches thick. A cross-section of these cylinders will present an area proportional to the squares of their diameters, and if the pressure be produced by the weight of plungers or pistons, as in the hydrostatic press, the weight required in the pistons will be as the squares of the diameters, or as 4 to 100.

Now carry this to two cannon of different calibers, and take an extreme case. Suppose the caliber of one to be 2 inches in diameter and the other 10 inches, and that the sides of each gun equal, in thickness, the diameter of its caliber. Then to develop the same force, per inch, from the powder of each gun, the inertia of the balls should be as the squares of the diameters of the calibers, respectively; that is, one should be 25 times as great as the other. But the balls, being one 2 and the other 10 inches in diameter, will weigh 1 pound and 125 pounds respectively—the weights being as the cubes of the calibers. Hence each inch of powder in the large gun will be opposed by five times as much inertia as is found in the small gun. This produces a state of things precisely similar to that of loading the small gun with 5 balls instead of 1; and although the strain thrown upon the gun by 5 balls is by no means five times as great as that by 1 ball, there can be, I think, no doubt that the strain produced by different weights of ball is in a ratio as high as that of the cube roots of the respective weights. This would give, in the example before us, an increase of from 1 to 1.71, or the stress upon the walls of the 10-inch gun would be 71 per cent greater than upon those of the 2-inch gun.

GREATER PRESSURE IN LARGE THAN IN SMALL GUNS.

The foregoing statement and comparison, however, do not present the whole case; for they are made upon the supposition that the charge of powder, in each instance, is as the square of the diameter of the

shot, or that the cartridges of the 2 and the 10-inch guns are of the same length. This, if we take the charge of the small gun at $\frac{1}{2}$ of a pound, would give but 8 $\frac{1}{2}$ pounds for the large, or $\frac{1}{15}$ of the weight of the shot. The velocity obtained from this charge would produce neither range nor practical effect, and to obtain these results, that is, 1,600 feet a second, we must either increase the force through the whole length of the gun to 5 times that required for the small gun, or, the force remaining the same, we must provide for its acting through five times the space. Neither of these conditions can be practically accomplished. However, by an increase of both the charge and the length of the bore, the result may, in the limits under consideration, be attained. Thus, taking the large bore, if we double its length and make the cartridge five times as long, increasing the weight from 8 $\frac{1}{2}$ to 41 $\frac{1}{2}$ pounds—or perhaps, having an advantage from the comparative diminution of windage and the better preservation of the heat, with a charge of from 30 to 35 pounds—we may obtain the full velocity of 1,600 feet a second. But this again increases enormously the strain upon the gun.

It does not appear obvious, at a first view, how an increase in the charge should increase the tension of the fluid produced from it, if the cavity inclosing it be proportionably enlarged. If a steam pipe a foot long will sustain the pressure of a given quantity of steam, of a given temperature, a pipe two feet long, of the same thickness and diameter, will sustain the pressure produced by a double weight of steam from the same boiler. Why then should the pressure upon a cannon be increased by a double length of cartridge? The difference seems to be this; with the steam, the pressure is as in a closed cavity; with the powder, the tension depends upon the movement of the shot while the fluid is forming. Now, whether the charge be large or small, the motion of the shot commences while the pressure is the same in both cases, and before the charge is fully burned, and with the same velocity in both cases; but with the large charge the fluid is formed faster than with the small, while the enlargement of the cavity by the movement of the shot is nearly the same in both cases. This destroys the proportion between the sizes of the two cavities, and the tension must increase faster, and become greater, from the larger charge. The law of this increase cannot, from the complicate nature of the problem, be stated with any reliable exactness, but we may, I think, conclude, from the increased velocity of the shot, and many other effects, that the stress thrown upon the gun by different charges of powder, within ordinary limits, will not vary essentially from the square roots of those charges. If then we increase, in the example under consideration, from a charge of 8 $\frac{1}{2}$ pounds to one of 32 pounds, the stress upon the gun, being as the square roots of these numbers, is raised from 2.88 to 5.65, or from 1 to 1.96. Having already increased the stress upon the gun, by the shot, from 1 to 1.71, if we multiply these together, we have a total increase of from 1 to 3.35. That is to say, if, under the conditions here stated, we load a gun of 2 inches caliber with 1 shot and $\frac{1}{2}$ of a pound of powder, and a gun of 10 inches caliber with 1 shot and 32 pounds of powder, the stress upon each square inch of the bores will be 3.35 times greater with the large than with the small gun; when at the same time, if the walls of both have a thickness proportional to the diameters of the calibers in each, the large gun will be incapable of sustaining a greater pressure per inch than the small one. Even with a charge of 12 pounds of powder, the stress upon the large gun must be more than double that upon the small gun when charged with one-third the weight of its ball.

It is calculated that about 8,000 dozen pounds of candles per week are used in the mines of Cornwall alone, taking no account whatever of the large consumption in private houses. This would make an annual consumption of about 600,000 lbs. of tallow every year; and the total value of candles used for mining purposes would, at an average of 5s. 3d. per dozen pounds, represent an expenditure of about £13,000 for candles alone.

A MRS. EGBERT, wife of one of the oil-well princes, recently forwarded \$5,000 to provide a Christmas dinner for the soldiers in the Philadelphia hospitals.

MAKING GRAPE SUGAR FROM STARCH.

We give herewith Payen's illustration of the apparatus, and description of the process, employed in France for the conversion of starch into grape sugar. The product is used for manufacturing beer and a coarse kind of alcohol, which is said to be extensively employed in the manufacture of French brandy:—

The saccharification of the starch is effected in large tubs or vats, A A', constructed of stout wood, to contain 2,800 gallons. In one of these, A', a lead pipe, b c d, coiled at the bottom, is placed, the circular portion being cut or perforated for the introduction of steam to heat the acidulous water with which it is two-thirds filled; the steam from the generator, i, is admitted to it at pleasure by means of the pipe, b f e g, and stop-cock, h. During the operation the vat is covered, and the disengaged vapor conducted to the chimney, D D; but before escaping it may be utilized in evaporating the sirup by conveying it through serpentine pipes, E F. By such arrangements the disagreeable odors resulting from the evaporation of the oil of the starch are considerably abated, being partly condensed in the serpentine pipe, so as to flow off with the water produced from the steam into a vessel interposed between the pipes, F G, and partly carried away by the pipe, F F', or the uncondensed vapors may be conducted into the fire where any remaining traces of essential oil are consumed, and thereby the nuisance is almost entirely prevented.

When it is proposed to convert two tuns of fecula in such an apparatus, the substance in portions of two hundred weight in a trough or tub, with twenty-two gallons of water, and when thoroughly steeped it is introduced by a funnel, a, in quantities of four to five gallons at a time, into the large tub or vat, which should be previously charged with about thirty-two barrels of water, and three quarters of a hundred of sulphuric acid agitated with it, the whole being raised to 21° by forcing steam into it. This temperature is maintained till all the fecula is introduced, and it is found that the transformation is accomplished in thirty or forty minutes after the last portion of the starch has been added. The point at which the change is completed is easily ascertained by simply testing a few drops of the clear liquid with a drop of a solution of iodine, when, if the saccharification be effected, no coloration takes place; in the contrary case the characteristic violet of iodide of starch manifests itself. After the conversion into glucose, the introduction of the steam is suspended, and the next operation is the saturation of the free acid by means of carbonate of lime, and the consequent precipitation of sulphate of lime. The latter being but sparingly soluble, most of it falls to the bottom. It requires from ninety to a hundred pounds of chalk to saturate the whole of the free acid; and this must be introduced gradually to guard against the evolution of too much carbonic acid at once. If an excess of lime be used, it prevents the solution from clarifying so readily as when the sulphuric acid is barely taken up; this is shown by the cessation of effervescence, and the inability of the liquid to change the blue color of litmus to more than a feeble purple tint. When the saturation is completed, the mixture is either permitted to repose in the same vessel, or if it be required to operate upon another batch at once, it is drawn off into the lower vat, A'', where it is left at rest during twelve hours; the clear liquid is then racked through coarse bone-black in the filters, H H, the deposit of sulphate of lime being also thrown upon cloth filters, where it is drained and washed. The sirup as it flows off from the filter, having a density of 1.11 to 1.12, is retained in the reservoirs, L L L, from which

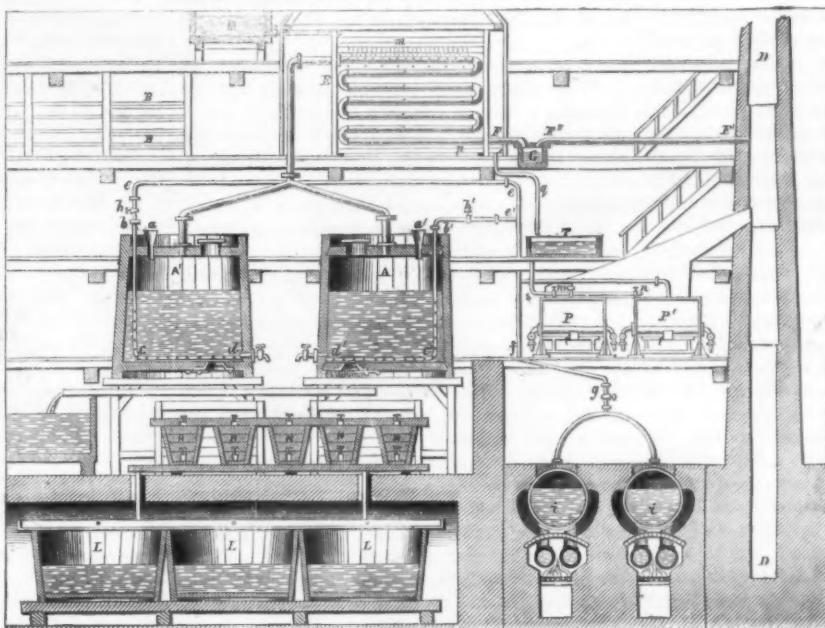
it is raised by a pump or a chain of buckets to the reservoir, M; from this it is distributed in a horizontal channel, m, by numerous lateral apertures upon the serpentine evaporator, E F, and then flows by a channel, p, and tube, q, into a receiver, r, whence it can be drawn at will by the tube, s, and stop-cocks, n n, into the boilers, P P', which are heated by steam, and in which the liquid is concentrated to 1.26 specific gravity. The sirup thus obtained, after reposing a sufficient time to allow the sulphate of lime precipitated by the evaporation to subside, is fit for the brewer or distiller; but if intended for the confectioner or liquor maker it should be allowed to rest for twenty-four hours, filtered when cold through coarse bone-black, and casked immediately. When it is desired to obtain the glucose in a solid state, the evaporation is carried so far as to concentrate the sirup to 1.38 or 1.39 specific gravity

liquor may still contain is saccharified.

The desiccation of the drained sugar was long a work of difficulty, the moisture of the air being sometimes sufficient to convert it again to sirup, which, with the heat of the factory, melted and agglomerated the remaining portion. M. Fouschard has obviated these inconveniences by furnishing the tuns or tubs, R R, with tables of plaster of Paris, which absorb the portion of the interposed sirup. This very much quickens the desiccation of the crystals, especially in a current of air heated to 77°, taking care that the granules are not thereby soldered together. There is, however, a certain amount of the crystallized mass which has to be submitted to a second solution, namely, that which is agglomerated on the end of the loaf resting on the plaster; this must be separated, and the sugar extracted from the sulphate of lime, by grinding them between cast-iron cylinders, and dissolving in the ordinary way.

Coating one Metal with another.

The London *Times* states that the large iron floating fire engine kept moored in Chatham harbor, in readiness for use on the occurrence of fires either at the dockyard or in the town, has been towed down to one of the vacant slips near the boat-house at the dockyard, for the purpose of having the bottom cleaned and examined. On being hauled up on the slip the condition of the bottom of the vessel afforded another proof of the worthlessness of all the so-called "anti-fouling" compositions hitherto in use in the Royal Navy for preserving the iron plating, and at the same time preventing animal and vegetable accumulations on the bottoms of



—73° to 74° Twaddell; it is then poured into the cooler, where it is kept till the crystallization commences, and thence transferred to the tuns in which the solidification is effected.

Of late years, instead of preparing the sugar in an amorphous solid mass, as by the preceding method, it is obtained in grains or regular crystals. The process for converting the starch into sugar is the same as that already described; but care is taken to do it more thoroughly, since any excess of dextrin in the sirup is found to prevent crystallization. After the acid has been neutralized, and the lime salt removed by deposition, etc., the saccharine liquid is decolorized, and concentrated to 1.30, or 60° Twaddell, in summer; and 1.262 or 53.5° Twaddell, in winter. At these stages it is racked off into large reservoirs where the lime salts settle down; and during this period it is necessary, in order to prevent any fermentation, that the liquid be cooled either by circulation of air or of cold water in a coil placed in the vessel. After thirty-six to forty hours, the sirup, being clarified and cooled to about 65°, is put to crystallize in ordinary tuns furnished with a false bottom placed over the lower one, which is pierced with a number of holes that are stopped with wooden pegs. These tuns are placed on stages along the walls of the room, twelve to fifteen inches above the floor. A sheet of lead or large canal or sluice, reaches along each range of crystallizing tuns. To avoid the fermentation of the sirup, which in summer often prevents the crystallization, six or seven ounces of sulphuric acid solution are added to the content of each tun. At the end of eight or ten days the crystallization commences and goes on, the crystals depositing in succession. When the bulk of two-thirds of the liquid becomes a mass of crystals, the pegs in the lower bottom are withdrawn, and the still fluid portion is permitted to drain off, the operation being quickened towards the end by tilting two adjoining tuns against one another. The drainings are conducted to the converting tun, where any dextrin the

iron vessels. Perhaps in no other river or harbor in this country do the bottoms of iron ships foul so rapidly as in Chatham harbor, and consequently every precaution is taken by the officials for the preservation of the hulls of iron ships by means of the best anti-fouling mixtures which science has yet discovered. It appears that the new mercurial anti-fouling composition, the invention of Mr. Gisborne, is to be applied to the vessel.

What Industry and Energy can Accomplish.

Mr. J. C. Whitin, the mechanic in the firm of P. Whitin & Son, now the exclusive owner of the machine works in Whitinsville, Mass., is building a large shop, three hundred and fifty feet in length, by seventy wide, and four stories in height, with foundry and forge shop to correspond, for mechanical purposes. With the old shop, parallel to, and connected with the new, three hundred feet by one hundred, and three stories high, it will make the largest establishment of the kind, owned by a single individual, in the United States. Mr. Whitin commenced life with but little, save skill, industry, and determination. He is the inventor and manufacturer of the famed Whitin Picker. The entire works when in full operation will employ over a thousand mechanics and laborers.

SPECIAL NOTICE.

JOSEPH W. FOWLE, of Boston, Mass., has petitioned for the extension of a patent granted to him on March 11, 1851, for an improvement in steam drilling machines.

It is ordered that the said petition be heard at the Patent Office, Washington, on Monday, Feb. 20, 1865.

All persons interested are required to appear and show cause why said petition should not be granted. Persons opposing the extension are required to file their testimony in writing at least twenty days before the final hearing.



A Disconsolate Inventor.

MESSRS. EDITORS:—In the current volume of SCIENTIFIC AMERICAN, page 362, under head of "Machine for Registering Musical Notes," it says, "Herr Endres, of Mayence, discovered a machine which will write down music as fast as it is played," etc. "This machine which is still a secret (the working-principle) may be adapted with very little trouble and at small cost, to any new or old keyed instrument, such as the organ, piano, melodeon," etc., etc. This machine may be new to some, but it is not to me. I was not surprised at the announcement, but felt grieved at my own delay; for long ago (some five or six years), I conceived a plan for making such an instrument. Judging from descriptions of that of Herr Endres it would have been constructed on similar principles, I have since devised a plan, which is simple and effective, for registering music as fast as played. My reason for not making my device public was in order to acquire a thorough musical education or knowledge of keyed instruments, in order to the perfecting of my machine. So much for delay. I am now superseded. Let this be a warning to inventors in general. I do not wish to rob Herr Endres of the glory of his achievement, but make this statement to show that the idea was not original with him alone. This I can demonstrate to any musician or pianist.

If Herr Endres should doubt this statement, I can present a method for registering music, by playing the piano, which is simple and effective in operation. I can demonstrate the rudimental operation or working principle without resorting to his "secret" mechanism. As I stated before I have not my machine perfected or matured, and, as I am now superseded, I suppose I may as well defer further claim to this novelty. Yet I still lay claim to it as a Yankee idea. It is hard to beat Yankeedom; they will think, and you can't stop 'em. I could not pass unnoticed the above named article, as it gives all the praise to a foreigner. By publishing this communication you will do justice to an American.

FRANKLIN CARLISLE.

Milwaukee, Wis., Dec. 4, 1864.

[Our worthy correspondent is altogether too despondent about his invention. It does not follow by any means, that because Herr Endres of Mayence has invented a music registering machine, that every one else must sit down and fold their hands. Bring out your machine! put it through! Delays are certainly dangerous. Herr Endres is far enough away, but even if he were in the same town with our correspondent, one inventor would have an equal chance with the other; that is all any of us can expect. Perfect your machine, bring it to public notice, and if it have good qualities you will be certain of a reward.—Eds.

Universal Chuck for Jewelers Wanted.

MESSRS. EDITORS:—I wish you would mention in your interesting paper that watchmakers and jewelers need a small universal chuck for their lathes. It should be neat, strong and accurate, just large enough to take in the largest wheels and barrels of watches, and should also grasp small pivots. It would be one of the most useful tools in a shop. I have in vain searched for one in New York and Albany. I would give \$25 for such an instrument.

L. F. HALL.

Fonda, N. Y., Dec. 10, 1864.

[Mechanics and inventors will no doubt bear this hint in mind. A chuck can be made and sold much lower than the price named, with a good profit.—Eds.

The Chicago Lake Tunnel.

A few days since the Common Council of Chicago made an inspection of the Lake Tunnel. The Tribune says:—

"The bottom was reached in safety, and the party stepped out into the void—a long bore, five feet in diameter, and stretching away lakeward a distance of eleven hundred and twenty feet—nearly one-quarter of a mile. A platform raised nine or ten inches from the bottom gave a good foothold, but left a

rather humiliating amount of perpendicular room in which to walk. But the party set forward, bent (nearly double) on exploring the farthest recesses of the gloomy vault. 'Twas a long, wearisome creep, and long before the end was reached, the knees and back began to tire, while the elevated temperature—fifty eight degrees—made it uncomfortably warm.

"People who are accustomed to the idea of cool cellars in summer may be surprised at being told that the temperature at nearly eighty feet below the lake surface is so much greater than above ground, but such is the fact. There is a uniform temperature all the year round at a point about sixty feet below the surface, the average only varying with the latitude; in the latitude of Chicago it is about fifty-two degrees; the balance of six degrees being due to the evolution of carbonic acid gas from the lungs of the workmen and the burning lamps. Were not a good system of ventilation in use, changing the air often, the mercury in the thermometer would rise much higher from the operation of the above-mentioned cause.

"Down in that work the ventilation is as good as could be desired. A thorough draft is kept up through a large pipe extending the whole length of the work, and the operation of this is needed only to change the air made foul by breathing and boring. The soil through which the miners are digging is remarkably free from those poisonous gases which are so great an obstacle in most underground operations. Only twice have the workmen been troubled with gaseous outbreaks, and but one of those was of such magnitude as to necessitate a suspension of labor.

"At first this work was attended with many difficulties, the shifting sand offered an impediment at the beginning, which was only overcome by the employment of iron cylinders for the upper twenty seven feet of the shaft; and the pumps clogged, and the gearing broke, but now all goes on smoothly—save an occasional strike among the workmen—and the work proceeds nearly as fast as it would above ground. The miners dig out the clay, making a cylindrical hole of about six feet and a half in diameter, loading the clay on little cars, which are then run on a tramway to the shaft and thence elevated to the open air. They are followed at a distance of a few feet by the masons who lay the bricks in two courses, packing them into the clay round the lower half of the arch, and filling in with cement on the upper half. The whole is thus made compact, and capable of resisting any pressure short of one of those general upheavals which in times past have revolutionized the surface of our globe. The whole thing is solid as the rock itself, and there seems no reason to apprehend a collapse either outward or inward. If the work should be finished without accident, it would seem that there is no chance for future displacement.

"The work is now progressing at the rate of ten linear feet per day of twenty-four hours, the men being worked in three gangs, each of which takes an eight hours' shift; so that the job is prosecuted night and day. Nearly half a mile will have been finished by the first of May, at which time the now finished crib will be taken out to its destination—two miles from shore—and sunk; the work will then proceed from both ends, and the whole tunnel be finished and in running order by the end of 1866."

Asphaltum Mines and Springs in Santa Barbara County.

No section of California contains such immense outcrops of mineral pitch as the county of Santa Barbara. From the line of San Luis Obispo, where the Kuyamas river enters the sea, to the boundary of Los Angelos, opposite Anacapu, it is met in hundreds of places as hard as a rock, or soft as putty, as consistent as pitch, or as liquid as oil. Indeed, an immense deposit seems to underlie the lands of the country from Buena Vista lake to the ocean; and in boring for water it has been met with in such unpleasant quantities as to render valueless expensive outlays. A spring of it boils up in mid channel, opposite to the northern end of the island of Santa Cruz, which is of excellent quality, and is sometimes found so abundant as to be easily gathered from the surface of the sea by passing vessels. Several of the old California coasters assure us they have collected it repeatedly from ships' boats. It was in common use

before 1846, in place of coal tar, for marine purposes, in painting iron and wood, for which it was found in every respect vastly superior.

Near the Carpantaria it is found close to the sea beach mixed with sand and clay, and of the consistency of putty or baker's dough. In another place on the sea cliffs of the Dos Pueblos farm, it is met in fine veins as brittle as rosin; while in the hills near the Mission of San Buenaventura the earth, for thousands of acres, is impregnated with the substance in a most extraordinary degree, and, as we are informed, in some places petroleum oil of an excellent quantity may be obtained by simply digging a well, which will fill up in a few hours. Valuable and extensive deposits both of asphaltum rock and of liquid pitch are also found in the vicinity of the Santa Ynez river. The formation extends into the upper valley of the Kuyamas, farther east, and even over into the opposite country near Buena Vista lake.

The most celebrated and best known deposit of asphaltum rock in the State is that on the Goleta farm, nine miles from Santa Barbara going up the coast. The substance obtained here has been used by the people of the country for the last fifty years for roofing and paving. It is the same article used for similar purposes in San Francisco since 1855. It is believed that some \$30,000 worth of the mineral has been got out in that time by squatters and interlopers, to the detriment of the owner's interests. The formation is several hundred feet in breadth, and of unknown length and depth. It runs a great distance under the sea, and is exposed in immense masses in the high cliffs immediately overlooking the ocean. It is easily dug out and taken off in boats to vessels anchored a few hundred yards off. This is perhaps as accessible and valuable a vein of asphaltum rock as exists in any country. The hard material can be applied in a vast number of cases in the arts and sciences, and in building and construction.

Barnum's Museum.

A world of wonders is condensed in Barnum's American Museum. It is peopled by giants, pygmies, monkeys, Circassian and fat women; a living whale, seals, snakes; a great variety of fish in aquarial tanks; snakes and thousands of curiosities. A snug little office in a corner is the magic cave where the chief sorcerer and master of all these wonders exerts his powers. Barnum himself, busy, smiling, prompt, never at a loss, sits there pulling strings that move at once, hunters and seamen in Africa, the Asiatic Islands, the Arctic seas, and at the same time the tiny dwarf that trots in for a joke with Mr. Barnum, the singers and performers in the crowded lecture-room close by, and the millions of patrons who for thirty cents apiece receive the Open Sesame to uncounted sights of entertainment and instruction. The holidays are coming; and lo and behold, the tireless wizard is preparing for the people of the great city, and for their country cousins too, still other unknown wonders. Chief among them, a little bird whispers, is to be a Grand Spectacle which shall sparkle, glow and dazzle with splendors and astonishments far beyond aught that the Continent has ever seen. It is one of the miracles of a republic, that even this King of Showmen can render so much in return for so little; a miracle that only Barnum himself can explain. You can go and ask him all about it, if you like, at Christmas time.

HOW SOME FRENCHMEN EARN A LIVING.—Necessity—the mother of invention—has been fertile in expedients in the twelfth arrondissement of Paris. There is the maggot-breeder for the fishermen of the Seine; the money-lender who charges cent. per cent. by lending from sunrise to sunset; the poor *revilleuse*, who goes from house to house, through the winter nights, to waken sleepers who must be at the markets; and there is the 'guardian angel,' whose business consists in seeing drunkards home from the wine shops, at the rate of ten sous per drunkard! Behind all these quaint bread-winners, there are crowds of men and women, who depend on public or private charity.

A VALUABLE New-Year's gift would be a year's subscription to the SCIENTIFIC AMERICAN. How many young mechanics would rejoice in being thus remembered by their employers! It would make them better workmen.

RECENT AMERICAN PATENTS.

The following are some of the most important improvements for which Letters Patent were issued from the United States Patent Office last week; the claims may be found in the official list:—

White Paint Composition.—The manufacture of white-lead for painting has been continued from the earliest ages to the present time, but without much improvement. It has always been objectionable for external use, where it is much exposed to the weather, owing to its oxidizing a short time after it has been applied. The oxygen of the atmosphere, acting on the lead, reduces it in a few months to a white powder, when it soon falls off.

When the oxide of zinc was first introduced for painting, a few years ago, it was supposed it would in most cases, supersede the use of white-lead as a pigment, as the same objection could not be used against it, that is, oxidation from the atmosphere. This was true, but a still greater objection was soon apparent, which was the extreme hardness with which it dried on the surface, and when acted on by the weather it soon peeled off in scales, leaving the material painted entirely bare.

In the list of claims published last week an invention was reported of a new paint composition for which Letters Patent have been obtained through the Scientific American Patent Agency, and which, as claimed by the patentee, obviates both of the above objections. The materials from which it is made, when properly prepared, form a homogeneous opaque pigment, so constituted and nicely proportioned that, when applied to wood, tin, iron, brick or stone, it will not oxidize or peel off, but will withstand the elements to a remarkable degree. It is well known by painters that yellow ochre is one of the most durable paints. Its constituents are silica, oxide of aluminum and oxide of iron—the latter giving it the yellow color. In manufacturing the improved paint composition, the oxide of zinc is substituted for the oxide of iron; these are then mixed with pure linseed oil and ground with powerful machinery until they become homogeneous.

The patented claims for this composition are the following qualities and advantages:—

First, that it mixes chemically and not mechanically with linseed oil, thereby forming a more perfect compound than oil and lead. Second, that it works more easily under the brush than either lead or zinc. Third, that when it is mixed for use and stands a few days, it will not become fat, as termed by painters. Fourth, that it can be put on either thick or thin, in one, two or three coats, as the case may require, without running. Fifth, that it mixes with all colors chemically, producing soft and beautiful tints. Sixth, that it will not harden and peel off under water, as zinc, but possesses great elasticity and durability. Seventh, that it will not injure the workmen who use it, as the materials are innocent—lead frequently producing that terrible disease, painters' cholic, and afterward paralysis or premature decrepitude and lingering death. Eighth, that 100 pounds contain more than three times as much linseed oil as the same quantity of good lead, which renders it, as all painters know, much more durable. Ninth, that 100 pounds will cover seventy-five per cent more surface than 100 lbs. of lead, and that the price is twenty-five per cent less per pound than lead, making it, for use, half the price of pure white lead. These are some of the advantages claimed for the paint composition. The inventor is James Trippe, Orange, N. J.

Car Door Latch.—This invention relates to an improved latch of that class in which the parts are arranged with the handles of the same in such a manner that when force is applied to the handles in order to disengage the latch in order to release the door, the same force, or its continuation in the same direction, will serve to slide open the door, thereby rendering but one manipulation necessary in order to effect the above result. John Stephenson, of New York City, is the inventor.

Mowing Machine.—This invention relates, first, to a novel and improved arrangement of a tubular axle and pendants, whereby the framing ordinarily used is dispensed with, and at the same time an extremely light and durable machine obtained. The invention consists, second, in a toothed segment and rack, arranged as hereinafter fully shown and described, for

raising and lowering the cutter bar. The invention consists, third, in a novel manner of attaching a tube, on which the toothed segment is secured to the axle, whereby a firm connection is obtained and one which admits of the free turning of the tube. The invention consists, fourth, in a novel and improved manner of connecting the bent vibrating lever to the sickle bar, whereby the former is not allowed to interfere with any of the parts of the machine in whatever position the sickle bar may be in, and a shoe of moderate width permitted to be used at the inner end of the finger bar. The invention consists, fifth, in casting the shoe and tube, which form the main connection of the finger bar to the axle, all in one piece, whereby economy and strength in the construction of the machine are obtained. L. G. Kniffen, of Worcester, Mass., is the inventor.

Apparatus for fermenting Malt Liquors.—This invention consists in the employment or use, in combination with a fermenting tun, of a solid or hollow body, suspended from a rope or chain or otherwise arranged in such a manner, that it can be lowered more or less into the liquid contained in the fermenting tun, and that by its action the liquid is forced up in the annular space between the outside surface of the immersed body and the inside circumference of the tun, and the froth rising to the surface of the liquid during the fermenting process can be made to flow over the edge of the tun, and thus be separated from the liquid simply by adjusting the position of the immersed body. The froth thus discharged is received by a circular trough secured to the outside of the tun near its top edge in an inclined position and provided with a spout at its lowest point, through which the impurities discharged from the tun are conducted to a suitable receiver. In order to regulate the temperature of the liquid in the tun the immersed body is made hollow, so that it can be filled partially or wholly with cold water and ice, or either, and strips of wood or other suitable material secured to the inside surface of the tun, keep the immersed body properly in the center of the tun and guide it during its ascending or descending motion. Adolph Hammer, of 132 West 34th street, New York, is the inventor.

Burglar Alarm for Drawers or Tills.—The object of this invention is to obtain an alarm mechanism for a drawer or till, constructed and arranged in such a manner that an alarm will not only be sounded in case an attempt is made to open the drawer or till illegitimately, but a lock mechanism, which is combined with the alarm, will effectually prevent the opening of the drawer or till, so that the proprietor of a store will not depend upon the alarm solely to guard against pilferers, but will also have the lock, which is provided with tumblers, to aid in preventing such mode of thieving. The invention is a very ingenious one, and a great improvement over the till alarm now in use. F. H. Purinton, of Willimantic, Conn., is the inventor.

FUZES.

The construction of fuzes is now justly regarded as at once the most important and most difficult department of the science of gunnery. With the recent progress of artillery it has become more and more evident that the shell is a vastly more destructive projectile than solid shot; not merely against troops in the field and wooden ships, but for breaching purposes against the strongest fortifications, whether of stone, brick, or earthworks. Even iron-clad ships, which were long considered completely impenetrable to shell, are now found to be as vulnerable to cylindrical shell as wooden ships to the old spherical cast-iron ones. Now, since the action of shells is entirely dependent upon the precision and unfailing action of their fuzes, the right construction of the latter is of vital consequence to the efficiency of artillery, and at the same time it must be admitted that the problem has hitherto proved most intricate and difficult, and at the present moment far from satisfactorily worked out. The fuse originally was a very simple affair—a tube of beech-wood filled with a mixture of meal powder, saltpetre, and sulphur, in which a piece of touch cord was placed and left projecting at the top. This inserted in the shell and ignited by the flash of the charge in the act of firing, caused the projectile to explode in a certain given time, and proved suffi-

cient for the necessities of the period, when shells, or as they were then called bombs, were merely employed in vertical firing—that is, projected upwards from mortars at an angle of 45°. The introduction of the practice of firing shell horizontally, and still more recent employment of rifled artillery firing lead-coated shot, demanded other requirements, to meet which fuzes have gradually assumed the aspect of a piece of mechanism. The old fuse was what was called a time fuse. Formerly when a town was bombarded the mortar battery probably remained at the same distance during the whole of the siege. Thus the time required to elapse between the firing of a shell and its bursting was a constant time, and the fuse once adjusted for the range no change in length was required, whilst they might be prepared at leisure. When, however, shell came to be used against moving bodies, as troops in the field or ships at sea, the power of making rapid changes in the length of fuse became necessary. A very simple alteration in the original fuse sufficed for enabling its time of burning to be instantaneously adjusted. Two channels instead of one were made in the old beech-wood fuse side by side, one filled with ordinary powder communicating with the bursting charge, the other with the slow-burning fuse composition. The outside was graduated to a scale, and by piercing the tubes at any given point so as to establish a communication, as soon as the composition burnt down to the point of contact the shell exploded. The efficiency of shell in certain cases was still further increased by the introduction of the percussion fuse, which, exploding on striking the object aimed at, obviated, in those cases in which it was applicable, all difficulty with regard to adjusting the fuse according to the range.—*Mining Journal*.

VALUABLE MINERALS IN CALIFORNIA.

We often hear outside of California of the high value and extended use of metals and minerals which abound in immense deposits in the Pacific domain. Bisau, which is extensively used in type making and the mechanical arts, and is now very high and scarce, is said to be found plentifully in some of our mineral formations. Antimony exists in immense masses, and of very rich quality, near the Tejon, and can be carted away from the top of the ground; it is said to contain a handsome ley of silver. Zinc and tin, which are now very expensive metals, are met with in valuable lodes in the counties of Mono and Los Angelos. Chromic iron is found in immense abundance in Monterey and other Southern districts. Iridium, osmium and platinum are not scarce in the gold washings of Klamath and Del Norte counties, and discoveries of these have also lately been made in Idaho. The sulphur deposits of Clear Lake and those of Nevada Territory are on a magnificent scale and of the purest quality. Borax, nearly free from extraneous matter, can be gathered by bushels, and there is no end of it, seemingly, in all the mountains of Lake county, where obsidian or volcanic glass, ready to make wine-bottles at a blow, is as plentiful as the world wants—a true mine of glass. Of porcelain clay of the finest quality there is a like quantity; and of umber, terra sienna, paint ochres of different colors, manganese and magnesian earths there is great plenty. As California has some of the purest aluminous clays in abundance, the new metal aluminum could likely be profitably made. As to copperas, soda, alum, jasper, agate, chalcedony, hematite and such substances, there is no end of them. It would be interesting and important to the owners of lands in which the various minerals above mentioned exist, to learn the markets and places of demand for them in Europe and the Atlantic States, and the prices which they ordinarily command there. Perhaps some correspondent who is familiar with the subject may have a few words to say about it.—*San Francisco Bulletin*.

A correspondent of the *Bristol Daily Post* states that a working man has, after 20 years' labor, at length solved the problem of perpetual motion! The secret may be had for the trifling sum of \$500,000. [We intend purchasing this mechanical marvel forthwith.—EDS.

A COLOSSAL bronze bust of William C. Bryant is to be placed in the Central Park in this city.

Improved Percussion Shot and Shell.

The projectiles shown in this engraving are peculiar in construction and of the class known as composite shells, or those made up in several pieces. In Fig. 1 a section of an elongated projectile is shown. In this form A is the outer jacket and B the inner. In both of them a series of grooves are turned which are afterward filled with lead, C, poured in through a hole bored in the outer jacket. At the rear of the inner jacket a space is left between it and the external casing; there is also a cavity in the shell proper, which is to be loaded with powder as usual. On the outside of the shell a band, E, of soft metal is cast to carry the forward end of the shot and center it accurately in the bore of the cannon. These shells explode by percussion or on striking; and the inventor states that when the forward end strikes the object aimed at, the lead bands, C, will be cut off by the shock, when the caps will be exploded by the back part of the shell striking against them. The inventor also states that by the peculiar shape of the elongated missile all tumbling is prevented, and that it will continue end-on throughout its flight.

The round shell shown in Fig. 2, is essentially the

anesthesia. After a short period the pulse became insensible, the respiration was arrested every now and then, and there was tracheal *rate*. Stimuli to the surface and artificial respiration were resorted to, and strong coffee infusion was injected. This alarming condition continued three hours, the anesthesia remaining complete and the pupils dilated, while occasional contraction of the limbs was observed. An hour later, however, the pulse rallied, and the skin became warmer, but anesthesia still persisted. At

beautiful vignette views, representing wells in process of boring, with the derrick over the orifice. The tureens are similarly adorned, while each separate piece is blazoned with vignettes descriptive and illustrative of the process of harvesting petroleum. The entire set is of the most costly character. The china is the finest and best imported, and the decorations are in the highest style of the decorator's art. The Messrs. Kerr were instructed to spare no pains in executing them, and they acted accordingly. The

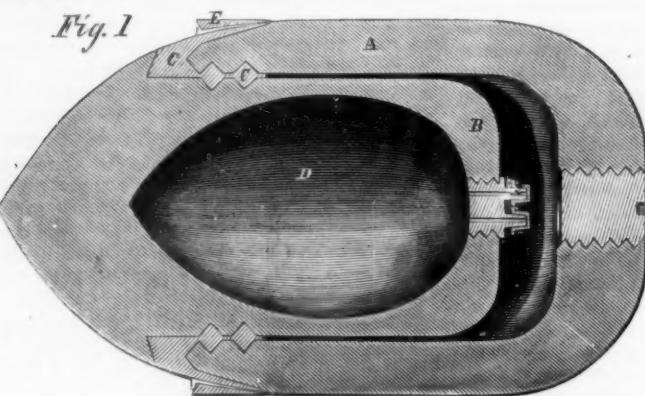
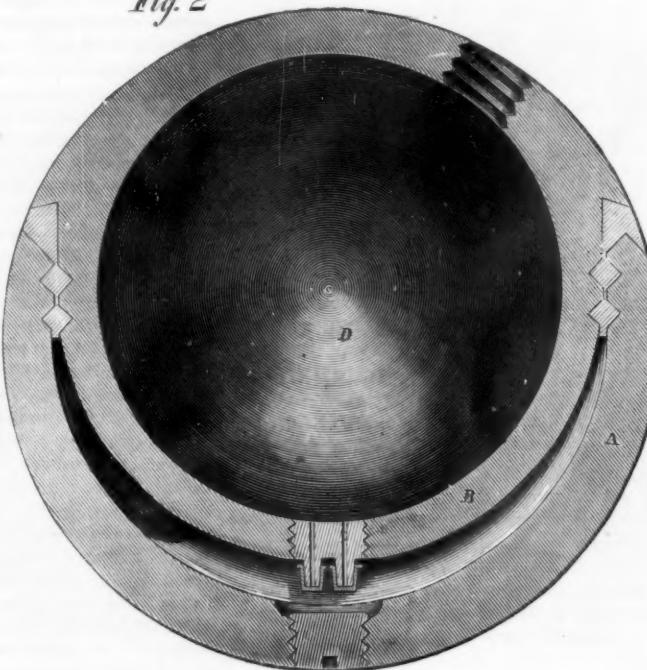


Fig. 2

**PFUND'S SHOT AND SHELL.**

same in principle but an aperture is left for the insertion of a time fuse, which allows the moment of explosion to be regulated at will. The resistance of the lead bands, C, can be increased at will by adding harder alloys so as to delay the moment of explosion in the elongated shell until it penetrates some distance in the target fired at.

A patent was procured on these shells by Anthony Pfund, on the 22d of October, 1861; for further information address the inventor at 114 West Thirty-fifth street, New York.

Dispensing with the Steeping of Flax.

It appears from the *Society of Arts Journal* that a French manufacturer named Bertin has invented what is reported to be a successful method of dispensing with the steeping of flax. After the fibers have been crushed in the ordinary way, M. Bertin submits them to a new process, that of friction between two channelled tables, which have a sideway as well as to-and-fro motion; in fact, the action is similar to that of rubbing the fibers between the palms of the hands, but under considerable pressure, and with great rapidity. The fiber is afterward beaten in water, which carries off every particle of woody matter, and leaves the flax completely unbroken and in parallel masses. The principle of friction tables has been applied by M. Bertin in other cases, and is said to furnish an economical, rapid, and perfect mechanical action.

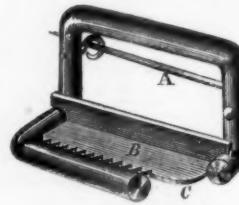
Chloroform Poisoning.

Dr. Mackay related the following case to the Medical Society of the Haut-Rhin: "A soldier, aged 27, on furlough, and in a state of drunkenness for several days past, seeing a bottle on a table, which he thought contained alcohol, drank off its contents, which consisted, in fact, of 12½ drachms of chloroform. He was found soon after vomiting, and soon became insensible, still continuing to discharge mucus. The pupils were enormously dilated, and his aspect was cadaveric; the respiration was stertorous, the pulse one hundred, and feeble, and the action of the heart occasionally tumultuous. There were present utter loss of consciousness, complete relaxation of the limbs, and absolute general anesthesia.

At the end of the sixth hour the amelioration was very manifest, and in another hour he was carried to the hospital. He retained no memory of what had passed, and neither convulsions nor delirium ensued; and the next day he complained of little but what might be due to his excess in drinking."

SCOFIELD'S SEWING WORK HOLDER.

This little article is intended for holding work so that the operator can draw or stretch it with the left



hand while using the needle with the other. It is fastened to the dress near the knee by the pin, A, and there is a serrated plate, B, which acts like the tongue of a buckle and holds the work firmly; the harder the seam is stretched the tighter the plate bites upon the work. The cloth is introduced at C, and the aperture is of such a width that seams of any ordinary size may be inserted. This is a very useful and durable little appendage, and will doubtless be appreciated by our lady readers. It is made of brass silver-plated, or in German silver, or any other metal as desired, and will no doubt be popular. It was patented on Feb. 19, 1861, by H. G. Scofield, of North Stamford, Conn.; address him for particulars as to rights, etc., at that place.

Remarkable China Ware.

An oil millionaire, out of gratitude to the source whence his wealth was derived, and with a desire to keep it before his mind, has had a complete set of table equipage made in Philadelphia, of china and glass. The embellishments of the plates, dishes and tureens are *fac similes* of the apparatus used in producing petroleum. The dishes bear on the center

decanters, wine goblets and tumblers are alike engraved with the insignia of petroleum. The completed ware is a curiosity. Nothing like it was ever seen in those parts.

A New Army Corps.

Major General Hancock, a veteran officer of high military ability, is now recruiting in Washington city the "First Army Corps," designed to embrace 20,000 men. Any veteran, who has served two years, has been honorably discharged, and is physically qualified, may enlist in the corps for one, two or three years. Those enlisting will receive from the Government a bounty of \$300 as soon as they are mustered in, and, in addition, the regular instalments from the Government, in proportion to the period of enlistment, as follows:—\$100 for one year's service, one-third paid on enlistment; \$200 for two years' service, one-third on enlistment; \$300 for three years' service, one-third on enlistment. Applicants should address, in writing, "Adjutant General of the Army, Washington, D. C."

A Four-legged Hen.

At the last meeting of the Polytechnic Association, Dr. Rowell placed upon the President's table a large living hen with four legs. The hinder pair were fully formed, but are not used in walking; being curled up and carried. Dr. Rowell remarked that they seemed to be part of a second animal in a rudimentary condition attached to the rump of the hen. He supposed that the fowl was hatched from a double yolked egg, which the dam had failed to push out of the nest—an unusual oversight.

Mr. William W. Murphy, Consul General at Frankfort-on-the-Main, sent to the New York Sanitary Fair a gold coin, believed to be the smallest in the world. Its value is one-sixteenth of a ducat, its weight two grains, and it is about an eighth of an inch in diameter. It is still in perfect preservation, although it was issued by the city of Nuremberg about the year 1814, when it was a free city of the Germanic empire. It is now in possession of a member of the Numismatic Society of New York.

whatever length of time might be necessary to wear out the rebel armies. The restoration of our currency would diminish by one half the cost of prosecuting the war, and would check the growth of the public debt by an amount equal to \$1,000,000 per day. It would double the incomes of that large portion of the people who live upon wages. Finally, it would place our finances in the sound condition, and secure their conduct in the provident spirit, which alone is worthy of a rich and powerful nation.

To make this measure fully operative, an act must also be passed repealing all provisions for making any interest-bearing notes a legal tender for debts. A considerable portion of the \$210,000,000 of specie estimated by Secretary Chase as being in the country in 1861, was held by the banks. That portion has been displaced by interest-bearing "legal tenders." But in order that there may be no inflation of the currency with \$200,000,000 of government notes in circulation, the banks must be compelled to absorb their share of these notes.

TINDER.

When a piece of paper is set on fire, it all burns up except the tinder—which comes from the hot blaze unburned. And yet, if a spark fall upon this tinder it will catch fire and burn far more readily and surely than paper will. Why does it not burn in the blaze with the other portions of the paper?

Paper is made mostly of vegetable fiber, which is composed principally of carbon, oxygen and hydrogen. The three elements when combined in this substance are all solid, but if they are separated, the oxygen and hydrogen take the gaseous form, while carbon continues solid. By the application of heat the vegetable fiber is decomposed, when the oxygen and hydrogen expand into gases. As the hydrogen at the high temperature comes in contact with the oxygen of the air, it combines with it to form water; in other words, it burns in the form of a blaze.

Could the carbon come in contact with the oxygen of the air at the high temperature of red heat, it also would be burned, but the volume of hydrogen envelopes it, thus preserving it from contact with the air. The body of hydrogen itself burns only upon its outer surface.

The heat absorbed by the hydrogen in its change from the solid to the gaseous state cools down the carbon below the temperature at which it will combine with oxygen, so that as the last of the hydrogen passes away, the fire is extinguished, leaving the carbon in the form of tinder. If paper is kindled in sufficient mass to keep up the temperature of the carbon to the combustion point, it also will combine with the oxygen of the air to form carbonic acid, which will pass off as a gas, leaving only the incombustible ash, which is the small quantity of mineral matter contained in the paper.

PROF. DOREMUS'S LECTURES.

FIRST LECTURE.

According to appointment Prof. Doremus gave the first lecture of a course on Pneumatic Chemistry at the Cooper Institute, on the 10th inst. Owing, doubtless, to the inclemency of the night, the hall was not filled to its capacity, but the audience made up intellectually what it lacked in numbers. The large hall was about two-thirds filled.

Professor Doremus introduced his subject by a general allusion to the importance of science on the world at large, and the variety of themes it offered for investigation and discussion. Through science we learned the structure of the globe, we made great advances in agriculture and the arts, and attained a more perfect state of civilization. Of the several themes, however, none were more attractive than Gases, "the ghosts or spirit form of matter." The peculiar features or properties of these were undiscovered until the last century; they are now known to possess qualities in common with ponderable bodies. The learned lecturer in speaking of the intricacy of chemical science alluded to astronomy, and asked, if this latter were bewildering in its manifold changes and infinite distances, what shall be said of chemistry whose transpositions, complications, combinations and separations are almost inconceivable? Many experiments were made to prove the assertion that gases had properties in common

with solids. Thus a number of lighted candles were placed in the bottom of a deep glass jar and suddenly extinguished by pouring gas over them from another jar above, showing that its contents descended upon the flame. The weight of common air was shown by a globe attached to a weighted scale so that the beam was just poised. When the air was pumped out of the globe by an air-pump on the stage the weighted end of the scale preponderated.

SECOND LECTURE.

Among the most striking experiments exhibited at the second lecture was the decomposition of water by sodium. A tall inverted bell glass filled with water was standing in a pneumatic trough on the platform, and the lecturer took some small pieces of sodium from a phial in which the metal was covered with naptha to shield it from contact with the air, and wrapping them in bits of paper to prevent his fingers from being burned, he pushed them under the bell glass. The sodium being lighter than water rose to the surface in the glass, and as oxygen has a stronger affinity for sodium than it has for hydrogen, the water was decomposed; the oxygen of the water combining with the metal sodium to form caustic soda, and the hydrogen being set free as a gas.

Water was also decomposed by potassium. In this case the metal was thrown upon the surface of the water where it swam about in the most lively manner, decomposing the water, combining with its oxygen to form caustic potash, and setting the hydrogen free. The hydrogen as it was set free took fire, combining with the oxygen of the air, again to form water. The experiment being on a very large scale, the action was attended by violent explosions and very brilliant coruscations.

The extreme lightness of hydrogen was shown by holding an inverted jar filled with the gas under a burning gas jet, and suddenly turning the jar over so as to bring the open mouth upward. The gas from the jar immediately floated upward in the air, and as it came in contact with the jet it burned with a loud report.

The novelty of Professor Doremus's experiments consists in the unparalleled scale on which they are conducted. In decomposing water with potassium, he had a tank 5 by 10 feet in size, and blocks of ice weighing 100 pounds.

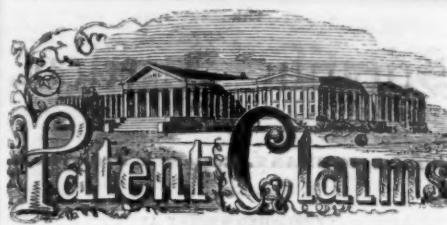
A NOTICEABLE FACT.

While every other journal in the country has doubled its subscription price, the rates of the SCIENTIFIC AMERICAN are the same as last year, so far as relates to our regular mail subscribers. Every intelligent reader can see at a glance that it is only by a large subscription list that we can publish the paper at present rates without incurring a loss. We feel certain that this hint will be enough. The SCIENTIFIC AMERICAN is a sufficient recommendation of itself without further comment, and in continuing to furnish it at the usual rates, we count largely on the support of our patrons.

A Large Magnet.

Among the philosophical apparatus belonging to the Free Academy in this city, is an electro magnet weighing 650 pounds, which has held seven men suspended at one time, and how much more weight it would support nobody knows. This magnet was made by Charles T. & J. N. Chester, of 104 Centre street, in this city. It is formed of two round bars of the softest iron, each 4 inches in diameter and 24 inches in length, which are secured at one end by massive screws to a cross piece to form a U magnet. The bars are wound with 200 pounds of No. 13 copper wire, insulated with cotton and shellac, and laid on in eight equal lengths, making the finished bar about eight inches in diameter. The armature is a bar of soft iron weighing 80 lbs. A neat wagon is employed for moving this magnet about the room, or it may be suspended from the ceiling by means of a block and tackle.

KIMBALL'S SCREW-HOLDER.—From a misapprehension of the uses of this efficient little article, recently illustrated on page 384 of this volume, it was stated to be a *workholder*. The inventor informs us that he intended it solely as a screw holder, for which purpose it is well adapted. The patent was issued Nov. 8th, 1864, not Aug. 30th, as given.



45,382.—Potato Masher.—Wm. Ball, of Peru, Mass.: I claim, first, The standard, b, terminating at its upper end in a horizontal arm, m, for supporting the follower by means of its rack and pinion, and swiveled at its lower end in the ring supporter, f, so as to be capable of being turned horizontally to one side, in combination with the said ring supporter, f, and standard, a, as herein described.

Second, The cylinder or shell, e, provided at its lower edge with lugs, c, in combination with the slots, n, and supporting ring, f, in the manner and for the purpose specified.

45,383.—Harvesters.—Joseph Barnes, of Rockford, Ill.: I claim, first, The combination of the frame, the driving wheel, the gearing and the tongue, substantially in the manner described.

Second, The bed-plate or gear frame, A, when constructed and arranged to operate as described.

Third, The combination of the driving wheel and gearing with the bed-plate, when arranged for joint operation, as set forth.

Fourth, The combination of the stationary toothed ring, D, with the planetary gear, g, as described, for the purpose of driving the crank shaft through the table, or arm, of the driving wheel, as set forth.

45,384.—Lamp Wick.—Thomas Bingham, of Newburgh, N. Y. Ante-dated Jan. 31, 1863:

I claim the substitution of wool, in whole or in part, for wicks to lamps for burning fluids, camphene, kerosene, carbon and other oils, and for all illuminating purposes requiring a wick or conductor, substantially as set forth and described in the foregoing.

45,385.—Hay and Straw Cutters.—C. D. & W. S. Brewer, of Lewisburg, Pa.:

First, We claim the press-board, B, shaft, k, arm, R, connecting rod, Y, and treadle, L, when arranged and operating as and for the purpose specified.

Second, We claim the rake, F, when attached to the press-board, B, operating as and for the purpose set forth.

45,386.—Stitching Horse.—George F. Brockway, of Washington, D. C.:

I claim a stitching horse provided with folding legs, a reach and clamps, all arranged substantially as herein shown and described.

I further claim the toggle, spring strap and treadle, and applied substantially as herein set forth.

[This invention relates to a new and useful improvement in stitching horses, such as are used by saddlers and other workmen in leather for the purpose of holding and clamping the same while being stitched.]

45,387.—Machine for Husking Corn.—A. W. Case, of South Manchester, Conn.:

I claim the revolving hopper, B, composed of a series of boxes, a, at the periphery of a wheel, in combination with the concave of fluted rollers, C, all arranged to operate in the manner substantially as and for the purpose herein set forth.

I also claim the cutter wheel, f, when used in connection with the revolving hopper, B, and concave of fluted rollers, C, for the purpose specified.

I further claim having the boxes, a, of the hopper, B, placed in an oblique position, so that the ears of corn will be prevented from lodging or catching between the rollers, as herein described.

[This invention relates to a new and improved machine for stripping husks from the ears of corn after the latter have been detached from the stalks.]

45,388.—Coal Scuttle.—George Chambers, of Ithaca, N. Y.:

I claim the aperture, g, the slide, c, with its handle, and the false inclined bottom, b, when used in connection as described, and equivalents thereto, for the purpose set forth.

45,389.—Heating Apparatus.—Thomas S. Clogston, of Boston, Mass.:

I claim so constructing and arranging a heating apparatus, in the manner described.

45,390.—Gas-Regulating Valves.—Charles M. Cresson, of Philadelphia, Pa. Ante-dated Dec. 3, 1864:

I claim a valve having a stem or tail, in which are two or more excavations or depressions of different lengths, arranged substantially as and for the purpose described.

45,391.—Inkstand.—David Cumming, Jr., of New York City:

I claim the case, A, with a movable bottom, B, substantially as described and for the purpose set forth.

45,392.—Hoop Skirts.—Theodore D. Day, of New York City:

I claim forming the joints in the front portion of skeleton skirts, in the manner specified, in order that the skirt may be folded or compressed when the person is seated, as set forth.

45,393.—Wardrobe Bedstead.—A. Dietz, of New Orleans, La.:

I claim, first, The hinged bottom, C, and platform, F, with bars, m o, to sustain the musketo net, in combination with the wardrobe, A, constructed as herein shown and described.

Second, The slide, l, links, j, and spring bolts, k, in combination with the catches, g, platform, F, and wardrobe, A, constructed and operating in the manner and for the purpose substantially as set forth.

[This invention consists in a hinged bottom, with legs, and hinged adjustable musketo frame, in combination with a wardrobe, in such a manner that on opening the wardrobe the bed bottom can be readily folded down and the musketo frame up, and locked, and by these means a bed can be fitted up and protected by musketo netting in a few minutes and with little labor. The musketo frame, when raised is fastened by double spring catches, which can be released by an easy and simple motion of the hand.]

45,394.—Machines for Loading Hay.—Leopold De Lacey, of Newark, N. Y.:

I claim, first, The supplemental endless carrier, M, when arranged

n the manner substantially as shown and described, so as to be capable of adjusting itself either wholly or partially by its own gravity, to operate in connection with the main carrier, as and for the purpose set forth.

Second. The endless rakes, A², in combination with the pulleys, X, bearing, q, and bars, A¹, all arranged substantially as shown, for the purpose of raking up the hay or grain, and depositing it upon the carrier, E, as described.

Third. The arrangement of the frames, A F, and carrier driving gear, I J, substantially as herein shown and described, for the purpose of rendering the carriers operative and inoperative when desired.

Fourth. The combination of the endless carrier, E M, endless rakes, A, mounted on wheels, and all constructed and arranged to operate when attached to a cart or wagon, substantially as and for the purpose herein set forth.

(This invention relates to a new and improved machine for raking up hay or grain from the field after being dried or cured, when cut and left by the harvester, and depositing the same on the cart or wagon.)

45,395.—Corn Planter.—John Doak, of Keithsburg, Ill.

First. I claim the adjustably-pivoted frame, E, when provided with the shovels, F, conducting tubes, F', grain boxes or hoppers, H, and covering wheels, I, and adapted to be operated by the lever, J, in the manner and for the purpose set forth.

Second. I claim operating the dropping valves, K, by means of pivoted arms or bars, F², actuated respectively by an angular groove, L, in the slide, L, substantially as set forth.

45,396.—Affixing Knives to "Straw Cutters."—Jacob Doersken, Derry Church, Pa.:

I claim the construction of the knife, A, with its handle, a, and fulcrum shaft or pin, E, screw and nut F, with the attached elliptical cutting blade constituting Fig. 3, in combination with the compound or double boxes, B B' with its slot, c, and screw bolts between them, resting on the base plate, b, attached by its brace, D, to the machine as shown, substantially in the manner and for the purpose specified.

45,397.—Gumming and Feeding Envelope Blanks.—James B. Duff, Patchogue, N. Y.:

I claim, first. The manner of constructing and fixing by a latch and catch the movable part, so that it can be turned under the gum box, without the necessity of stopping the machine.

Second. I claim the arrangement of the parts consisting of the plate, e, the rod, f, and the spring, and combining them as described, so as to make the plate, e, adjustable, and at the same time to keep and carry pressure upon the edges of the blanks.

Third. I claim the application of the gum, rubber cloth or other similar material having a resin, but not a rigid surface upon the upright finger, for the purpose of holding down the blanks by friction, tension and elastic or yielding contact as described, and at the same time allow the top blank to be carried away from the pile by the gum box above.

Fourth. I claim the form and construction of the gum box, B, for holding and distributing the gum.

Fifth. I claim the combination of the valves, stems, and rods, with said box, so that by the vertical motion of the box the valves will be made to open and close, in the manner and for the purposes described.

Sixth. I claim the combination of the plate, 13, and the rods and springs with said box, so that by the vertical motion of said box the plate will descend and disengage the envelope blank, as described.

Seventh. I claim the covering of the valve aperture with cloth to prevent the glue spreading or flowing in excess, as described.

45,398.—Pump.—Alfred Duvall, Baltimore, Md.:

I claim, first, Dividing up the face of the pump disk between the main arms, c, into a series of water ways, arranged as and for the purpose described.

Second. I also claim the forming of the face, or of the vanes or ribs upon the face of the disk, of the shape of a frustum of a flat cone, for the purpose of dividing the series of water ways near the center of the disk, and making them of the same size, so that the same area of that the discharge issues, substantially as described.

I also claim the arrangement of the projection, g, upon the shield, I, and the flanged ring, h, for the purpose of forming a water packing and a continuous waterway between the inlet and the pump chamber, substantially as described.

45,399.—Animal Trap.—Augustus J. Eddy, Winnesheik County, Iowa, and John B. Wilber, Howard County, Iowa:

We claim the combination of the spring, C, wire, G, lever, H, and trigger, F, constructed and operated as described.

45,400.—Buttons.—Philip W. Gengembre, Boston, Mass.:

I claim the improved locking mechanism, constructed substantially in manner and so as to operate as described.

45,401.—Buttons.—Philip W. Gengembre, Boston, Mass.:

I claim the arrangement of the spring, f, within the button body and with the jaws, c' c', and the opening, e, thereof, or the equivalents thereof, substantially as described.

45,402.—Buttons.—Philip W. Gengembre, Boston, Mass.:

I claim the improved button or button body, as made with the opening or slot, f, and the cross groove or jaws arranged together substantially as and for the purpose of aiding in fixing the button body to a catch, as described.

45,403.—Chimney Top.—A. L. Geserick, St. Louis, Mo.:

I claim a chimney top, C, the latter being provided with an opening, b, and a partition, a, arranged to form the passage, D, which communicate with the opening, b, the main part, A, and the external air, substantially as and for the purpose herein set forth.

[This invention relates to a new and useful improvement in chimney caps or tops for the purpose of improving and rendering perfect the draught of chimneys, whether the defect in the same arises from a faulty construction or an unfavorable situation.]

45,404.—Heat Radiator.—Clarendon B. Hall, Racine, Wis.:

I claim the radiator consisting of its shell, a, its frame, m, its damper, b, and its collar, b and d, constructed and operating substantially as above described.

[This invention consists in dividing the interior of a heat radiator into segmental divisions, communicating with each other, and combining therewith a horizontal damper which rotates so as to uncover different divisions at pleasure.]

45,405.—Hay-loading Machine.—James T. Hall & Isaac Pierce, Holland Patent, N. Y.:

We claim, first. The spring arms, e e, on collar, J, constructed and applied in the manner and for the purpose as shown and described.

Second. The combination with tire bar, U, of the rod, a, arm, Y, and rod, Z, substantially as shown and described.

Fourth. The combination of the standard, h, lever, g, and bar, f, or their equivalents, substantially as shown and described.

Fifth. The gathering boards, e c, and dividing rods, d, in combination with the frame, A, and the elevating apparatus herein described, substantially as and for the purpose set forth.

45,406.—Apparatus for Fermenting Malt Liquors, etc.—Adolph Hammer, New York City:

I claim, first. The employment or use of a body, B, either solid or hollow, in combination with a fermenting tub substantially as set forth so that by raising or lowering said body the height of the fermenting liquid in the tub can be regulated, and the liquid is cleaned without additional labor.

Second. The tub, A, with guide strips, e, and trough, C, in combination with the body, B, either solid or hollow, constructed and operating substantially as and for the purpose described.

45,407.—Passenger Support for City Cars.—James Hanley, New York City:

I claim, moving straps, b, hanging supports of passenger cars, to extend and contract, substantially in the manner and for the purpose herein described and set forth.

45,408.—Condenser.—A. Hartup & H. P. Gengembre, Pittsburgh, Pa.:

We claim, first. The use of the expeller, E E, arranged in combination with a condenser, A, and operating in place of the ordinary air-

pump, in the manner and for the purpose substantially as described.

Second. The float, d, applied in combination with the steam or compressed air pipe, F, expeller, E E, and condenser, A, in the manner and for the purpose set forth.

[This invention consists in the arrangement in the interior of a condenser of two or more conical pipes placed one over the other so as to leave an annular space between them and applied in combination with a steam or compressed air supply pipe, in such a manner that if by the action of the steam or hot air a current of water is impelled through the conical pipes, the annular space left open at the bottom end of the second tube allows the air in the condenser to be worked up by the water, and the atmospheric air is readily expelled therefrom without the use of an air-pump. The action of the injector, or more properly speaking, expeller, thus obtained is regulated by a float which opens or closes the steam or compressed air supply pipe.]

45,409.—Bread-slicer.—G. W. Hildreth, Lockport, N. Y.:

I claim, first. The vibrating knife, E, with one end hung to a pendant, g, swinging from a standard, f, in combination with the eccentric, J, connecting rod, i, link, k, dog, o, grooved wheel, d, substantially as and for the purpose specified.

Second, I claim the combination of the vibrating knife, connecting rod, and endless apron for producing an automatic feed motion, for the purpose specified.

Third, I claim the eccentric, J, in combination with the connecting rod and knife, to govern the thickness of the slice to be cut, as specified.

45,410.—Medical Compound.—Wm. Horner, Washington, D. C.:

I claim the within described medical composition.

45,411.—Hook and Eye.—Joseph Charles Howells, New York City:

I claim the construction of hooks and eyes for wearing apparel and other uses, substantially as shown and described.

45,412.—Metallic Guard for Water Buckets.—Jacob B. Hyzer, Jamestown, Wis.:

I claim, first. Enclosing a water bucket in a metallic guard, substantially as described.

Second. Constructing a metallic guard for water buckets so as to admit of the removal of the bucket, B, from the guard by taking off the ball thimble, A, as herein described and set forth.

Third. Constructing a metallic guard for a water bucket and adapting it to the bucket, so as to admit of the attachment of the trip bolt, e, to the guard instead of to the bucket proper, substantially as herein described and set forth.

45,413.—Curtain Fixture.—Hubert L. Judd, New Britain, Conn.:

I claim securing the spring, f, by the recesses, i i, in the manner and for the purposes specified.

45,414.—Snap Hook.—Oliver S. Judd, New Britain, Conn.:

I claim the employment of the spirally formed spring, E, in combination with the hook, A, and latch, C, when fitted into properly formed recess inside of said hook and latch, in the manner and for the purpose substantially as described.

45,415.—Smoke House.—Adam S. Kennedy, St. Louis, Mo.:

I claim a movable shield, A, of any form to be interposed between the fire in a smoke house and the meat suspended above the fire, for the purpose of preventing the grease from becoming ignited, substantially as set forth.

45,416.—Mowing Machine.—L. G. Kniffen, Worcester, Mass.:

I claim, first. The tube, B, placed loosely on the part, A, and provided with pendants, a' a'', and a groove, e, to receive the slide, d, of clutch, c, all arranged and combined as herein shown and described.

Second. The toothed segment, Q, and pendant rack, R, attached respectively to the tube, M, and draught pole or the bar, S, thereof and arranged substantially as shown to operate in connection with the lever, U, and chain, V, or their equivalents, for the purpose specified.

Third. The manner of connecting the tube, M, to the tube, B, of the axle as described, so as to admit of having a plate, L, attached to the pendants, a' a'', of the tube, B, and flanges, f f, secured to the plate, L, whereby a firm connection of the tube with the axle is obtained and the tube at the same time allowed to turn freely.

Fourth. I claim the arrangement of the connecting rod, G, bent lever, I, and link, J, to the cutter bar, K, in combination with the tube, M, and shoe, N, cast in one piece, as and for the purposes specified.

45,417.—Bedstead Fastening.—Spencer Lewis, Tiffin, Ohio:

I claim, first. The divided expandable dovetail fastening in combination with a bedstead, substantially as and for the purpose described.

Second. I claim the wedge head or foot slat for extending and lengthening the fastening substantially as set forth.

Third. The ledges or supporting devices, A, serving for sustaining the slats and as the main portion of the fastening, substantially as described.

Fourth. The combination of the several devices specified, for the purpose described.

45,418.—Range for Cooking and Heating.—P. W. MacKenzie, Jersey City, N. J.:

I claim, first. The combination in a cooking or heating range of the reservoir, A, with the inclined grate, B B', substantially as described.

Second. The combination of the shield or dumping grate, C, with the fire, B, substantially as and for the purpose set forth.

Third. The combination of the apron or plate, I, with the inclined grate, B, for increasing or diminishing the size of the fire, substantially as described.

Fourth. The combination of the inclined grate, B B', and cooking and heating range of the fire pot, T, constructed so as to admit whereby the heat is radiated from all parts of said pot both above and below the plane of the grate, substantially as described.

Fifth. The offence bonnet, N, constructed substantially as described and for the purpose set forth.

Sixth. The neutralizing cover in combination with the reservoir, A, substantially as and for the purpose set forth.

45,419.—Baking Powder.—George A. Mariner and James Fish, Chicago, Ill.:

We claim the preparation as herein described of a baking powder, by the combination of gum arabic, dextrose or other soluble gums or mucilaginous substances with the alkaline bicarbonates and the acids or acid substances, or with any other of the gas generating preparations in common use for such purposes.

45,420.—Priming Metallic Cartridges.—Edward Maynard, Washington, D. C.:

I claim the combination of a wad, B, of any suitable material, with the interior of a cartridge, A, so as to form a firm support for the inner end of a priming tube, D, passing out through the side of said cartridge, substantially in the manner herein set forth.

45,421.—Mode of extracting Tanning Properties from Bark.—James McGeary, Salem, Mass.:

I claim, first. The extraction of tanning properties of bark or other substances by means of steam under pressure.

Second. The extraction of tanning properties of bark in sheets or large pieces without previous grinding or other reduction, substantially as and for the purpose set forth.

Third. The extraction of tanning properties of bark or other substances by means of boiling under pressure in a tight vessel, in the manner substantially as shown and described.

Fourth. Saving the tanning properties contained in the steam which may escape from the boiler or other vessel, by the means described.

45,422.—Sewing Machine.—Gordon McKay, Boston, Mass., and Lyman R. Blake, Quincy, Mass.:

We claim in combination with a mechanism for reciprocating the needle stroke, to those variations in the position of the presser foot which are caused by changes in the thickness of the stock.

Also the means described for leaving the pressure free to move

downward from the lowest positions in which it is left by positive movement of its actuating mechanism.

45,423.—Seeding Machine.—Daniel E. McSherry, Indianapolis, Ind.:

I claim the head or disk, B, in combination with the feed wheel, C, having spiral threads, E, the several parts being constructed as specified and arranged in relation to the seed hopper, as and for the purpose set forth.

45,424.—Seeding Machine.—Daniel E. McSherry, Dayton, Ohio:

I claim, first. The lift bar, A, when constructed as described with loops, C, and hooks, C C, the same being attached to the frame of the machine by means of the suspended arms, E E, and held in its elevated position by means of the support, B, as herein set forth.

Second, I claim the projection, D, on the arm, E, when used in connection with the lifting rod, A, as and for the purpose specified.

45,425.—Heat-radiating Attachment for Flues.—Wm. P. Merrill, of Milwaukee, Wis.:

I claim the attachment of a radiator to a chimney flue combined with a damper, for the purpose of directing the waste heat through the radiator or allowing it to pass directly up the chimney, substantially as described and represented.

[This invention relates to a new and improved radiator applied to a flue or chimney provided with dampers, and all arranged in such manner that the products of combustion which pass up the flue from a stove or fire may, when required, be made to pass through the radiator in an apartment above that containing the stove or flue, thereby economizing in fuel and avoiding the necessity of passing a stovepipe through the floor, which has an unsightly appearance, and which is now done in order to obtain the same end.]

45,426.—Pigment and Vehicle for Mixing Paints.—John M. Merryman, Indianapolis, Ind.:

I claim the white clay paint pigment, and the solution to bichromate of potash in water, prepared and used in the manner and for the purpose, as above described.

45,427.—Plow.—Leander Miller and Hermann Kaller, Camp Point, Ill. Ante-dated Jan. 10, 1863:

I claim, first. The axle, C, provided with the cranks, D D, having the wheel, E, attached in connection with the lever, F, and stop bar, G, all arranged as and for the purpose herein set forth.

Second. The bar, I, attached to the bar, a, of the frame, A, as shown and secured at the outer right by the ears, J, and notched segment bar, J, in connection with the adjustable plow beam, K, attached to the bar, I, substantially as and for the purpose herein set forth.

Third. The combination of the adjustable beam, K, bar, I, and adjustable axle, C, all arranged as and for the purpose specified.

[The objects of this invention is to obtain a plow of simple construction which will be free from side draught, capable of being adjusted so as to regulate the pitch of the share as may be desired, and also to elevate it entirely above the surface of the ground when necessary, and also capable of having the wheels on which the frame is mounted adjustable, so that the implement may be kept in a proper horizontal position when at work, with one wheel in the furrow and the other on the unplowed land, or when both wheels are moving over level or unbroken ground.]

45,428.—Instrument for Destroying Caterpillar Nests.—Joseph S. Needham, South Danvers, Mass.:

I claim the implement made, substantially as and for the purpose hereinbefore explained.

45,429.—Damper Regulator.—William Noyes, New York City:

First. I claim the combination and arrangement of the semi-spherical piston, H, the piston ring, I, the piston recess, F, the tapering hole in the top of the piston, H, combined with the anti-friction, anti-corrosive metallic cylinder lining, B, the elastic packing ring, G, and the fulcrum pin, J, or their equivalents, for the purposes set forth and herein described.

Second, I claim the combination and arrangement of the angular notches, U U, in the cylinder ears, O O, the points or ears on the fulcrum pin, J, combined with the lever pin, N, the deep angular notch in the fulcrum, K, and the set screw, L, or their equivalents, for the purposes set forth and herein described.

45,430.—Fruit Ladder.—E. F. Olds, South Lyons, Mich.:

I claim, first. The adjustable table, D, with cleats, E E, in combination with the ladder and braces, G, as and for the purpose set forth.

Second, I claim the special arrangement of the adjustable braces, A, B, and joined together in combination with the joined sections, A B, when constructed and operating conjointly as and for the purpose set forth, substantially.

45,431.—Washing Machine.—J. W. Parker, St. Charles, Ill.:

I claim the radial arms, b, attached to the vertical shaft, C, and provided with the vertical fluted rollers, H, all arranged with the wash box or tub, A, substantially as and for the purpose herein set forth.

45,432.—Cooking Stove.—Moses Pond, Boston, Mass.:

I claim the improved stove as made with the air-heating chamber arranged around the front, the rear and the ends of the fire pot or fire-place and in the fire proof lining thereof, such chamber opening into the atmosphere and the oven, substantially in a manner as described.

I also claim the combination and arrangement of the slanting arched plate, k, with the fire plates, H and g, arranged with the oven and bottom plate of the stove, substantially as specified.

45,433.—Sorghum Juice Evaporator.—D. J. Powers, Madison, Wis.:

I claim the arrangement of a series of movable close partitions, E F, in an elongated pan or division, A, thereto, acting also as scrapers, to move the syrup forward, whereby the composition is conducted to any desired extent and with any degree of rapidity, the process being under perfect control, substantially as herein specified.

I also claim, in combination with the movable close partitions, E F, arranged in double pans or divisions, A B, the arrangement of the dampers, J, minutely adjustable to different positions to regulate the flame respectively under said pans or divisions, so as to heat or retard the evaporation, at the earlier or advanced stages, with the utmost exactness, substantially as herein specified.

45,434.—Sad Iron.—E. L. Pratt, Boston, Mass.:

I claim the application of an arm or rest piece to the handle of a sad iron, to operate substantially as described.

I also claim applying the handle that the extent of its rocking movement can be regulated and adjusted, substantially as set forth.

45,435.—Drawer of Tilt Alarm.—F. H. Purrrington, Wilimantic, Conn.:

I claim, first, the vertically sliding bolt, Q, in combination with a series of tumblers, L, arranged with springs and notches, to operate in connection with a bell alarm and to release the bolt, Q, when the notches, f f, are engaged.

Second. The pendent, J, provided with the two inclined flanges, f f, in combination with the lateral projection, n, on the bolt, Q, substantially as and for the purpose set forth.

Third. The notches, m l l, in the tumblers, L, in connection with the catch rod, t, and the plate, R, all arranged as and for the purpose specified.

45,436.—Machine for Registering Measured Grain.—Albert Rakestraw and Wm. Colwell, Chillicothe, Ill.:

I claim the revolving box, B, placed on or attached to the shaft, E, and combination with the tapped, E, and wheels or registers, F G, all arranged substantially as and for the purpose herein set forth.

45,437.—Steam Trap.—Charles B. Richards, Hartford, Conn.:

I claim the employment, in combination with the discharge valve of a steam trap, and the float by which it is actuated, of a counterpoising weight, or an equivalent therefor, so connected with the said

float as to render it more buoyant, substantially in the manner hereinbefore clearly set forth.

45,438.—Rain Sput.—Francis P. Rogers, Philadelphia, Pa.:

I claim the supplementary sput, B, in combination with the main sput, A, the same being constructed and applied so as to operate together, substantially in the manner described for the purpose specified.

45,439.—Horse Hay Fork.—Edgar D. Rundell, Hudson, N. Y.:

I claim employing in hay elevators a rest, or its equivalent, with the load discharging rope, lever or other device, substantially as and for the purpose set forth.

45,440.—Reducing Straw and other Fibrous Substances for the Manufacture of Paper Pulp.—Rebecca Sherman, Fort Edward, N. Y.:

I claim, first, the use or uses of the soapy solution prepared as herein described, in combination with any ingredient or ingredients which will combine with either in a heated state in a solution and reduce straw or any other fibrous substance to a pulp, for the purpose of combining the same into colored or colorless paper, commonly known as white paper.

Second, in the use or uses of the above-named different and described soapy solutions, for reducing straw or other fibrous substances to a pulp previous, and for the purpose of being used or manufactured into colored or white paper.

Third, I claim the use of combining a portion of the residue or waste liquid run off from a previous boiling (treated or not as previously described) with a sufficient portion of a new soapy solution, as previously described, for a new boiling of straw or other fibrous substance.

45,441.—Composition for Preserving Fruit Trees.—Lyman Smith, Gorsuch's Mills, Md.:

I claim the use of the within described composition for preventing the ravages of insects upon fruit or other trees, as described.

45,442.—Latch for Railroad Car Doors.—John Stephenson, New York City:

I claim the new article of manufacture, the door fastening hereinafter described, consisting of the hooked latch, B, and two handles, D D, rigidly secured upon and connected by the arbor, C, the casing, A, spring, E, and catch, F, all constructed and employed, as specified.

45,443.—Lamp Burner.—Cornelius St. John, Boston, Mass.:

I claim the combination of the self-adjusting clasp composed of the curved bars, d d, and the curved guiding rolls, c, with the cone, B, and burner, A, in the manner herein shown and described.

45,444.—Cheese Press.—La Cortes Tanney, Olmstead, Ohio:

I claim the arrangement of the arms, C and D, sheaves, c and d, in combination with cords, h p and p', and levers, H and P, when operating conjointly as and for the purpose set forth.

45,445.—Derrick.—Seth Turner, Onarga, Ill.:

I claim the rotating shaft, B, provided with the oblique arm, G, and fixed to the frame, A, shown in combination with the adjustable arm, J, and the rod or catch, D, and the notched ferrule, C, or their equivalents, for securing the shaft, B, all arranged and used in connection with a horse hay-fork and tackle, substantially as and for the purpose set forth.

(This invention relates to a new derrick, arranged in such a manner that it may revolve, and provided with a fork, tackle, spring and guide, whereby the hay or grain may be elevated to any desired height and then swung around over the stack, rick, cart or mow, and discharged, and the empty fork then lowered to be again loaded, elevated and discharged.)

45,446.—Nut-making Machine.—Lewis Weckesser, New Haven, Conn.:

I claim, first, the lever, K, arranged relatively with the cutter, H, and to operate in connection therewith, substantially as shown, for the purpose of rendering the blanks uniform in size, as set forth. (Second, The use of the rod, r, shovels, G, and the like, by means of the spring, e, and pin, b, substantially as shown, to admit of the rod or shovels in case of the latter meeting with any resistance in its work, becoming disengaged from the slide, as herein described.)

Third, The spiral passages, J J', for the purpose of turning the nuts respectively from a flatwise to an edgewise position, and vice versa, as described.

Fourth, The adjustable bar, m, forming the bottom of the chamber, l, and of less width than the same, to admit of the escape of scales, dirt, etc., therefrom, as set forth.

Fifth, The combination of the punch, L, and box, r, to insure the central punching of the blank, as specified.

Sixth, The horizontal intermittently rotating wheel, S, provided with a series of radical arbors, R, to receive the blanks, and turn the same so that its several sides will be consecutively acted upon by the hand, substantially as and for the purpose set forth.

Seventh, The plates, h', at the end of the slide, C', for the purpose of drawing the forged blanks from the arbors, R, as set forth.

Eighth, The wheels, s s', provided respectively with the teeth, r', and projections, g', in connection with the spur wheels or wipers, u, and the collars, v, in the arbors, R, for the purpose of raising and rotating the arbors to admit of the sides of the blanks being forged consecutively, as described.

(This invention consists in a novel and simple device for gaging the bar from which the blanks are cut previous to the cutting off of each blank from the bar, so as to insure the blanks being of the same size or of uniform dimensions. The invention also consists in the peculiar construction and arrangement of parts whereby the whole operation of punching and forging the blanks is brought within a very limited space, and a very simple device is obtained for the desired purpose and one possessing a number of advantages.)

45,447.—Fan Power.—W. E. Wilcox, St. Louis, Mo., assignor to himself and Bernard F. Myers:

I claim, first, The application of a friction brake to a balance wheel, which is keyed to a spindle receiving its motion from a train of wheel work, substantially as and for the purposes described.

Second, The combination of a spring, F, friction wheel, g, and an adjusting screw, p, with a balance wheel, E, and fan, D, substantially as described.

45,448.—Washing Machine.—J. B. Winchell, Chicago, Ill.:

I claim, first, The application of an oscillating bed of rubbers, g, to a cylinder, E, substantially as described.

Second, The rolling drum, H, applied and operating in conjunction with the oscillating bed of rollers and cylinder, E, substantially as described.

The arrangement of means, substantially as described, for reciprocating a series of yielding rollers or rubbers, and turning a cylinder, as set forth.

45,449.—Apparatus for Producing Scenic Effects.—William Calcott, London, Eng.:

I claim the combination of a sheet or sheets of glass painted in transparent colors covered in front with painted network and having a light backing, as hereinbefore described.

45,450.—Car Propeller.—Phillip Wm. Phillips, Bristol, Eng.:

I claim the combination of the "travelers" with a rail or rails applied and operating substantially as and for the purpose set forth.

Also the chain of levers attached to or acted upon by any motive power in combination with the travelers, constructed and operating substantially as and for the purpose described.

45,451.—Self-feeding Tobacco Cutter.—Richard Smith, Sherbrooke, Canada:

I claim the applying to a hand-cutting tobacco machine of a feed mechanism, substantially composed of a toothed plate, G, operated from the knife gate, E, which is moved through the medium of the like, C, all arranged in the manner substantially as set forth.

45,452.—Machine for Tapping Bolts.—F. Watkins, London Works, Birmingham, Eng.:

I claim, first, The arrangement of the levers, weights and pedals, substantially as herein described, for the purpose of reversing the motion of the machine.

Second, The yielding device constructed as herein described and used for holding round-headed bolts and stud ends.

Third, The hollow stationary axle in combination with the fast-pulley connected firmly to the hubs of the wheel webs and with the loose pulley running loosely on said axle, substantially as and for the purpose specified.

Fourth, The yielding cutting device arranged substantially as herein set forth for the purpose of cutting or chamfering the ends of the bolts during the process of threading.

This invention consists in the arrangement and combination of two machines in one frame constructed so that both may be used for either screwing bolts or tapping nuts, or one used for screwing bolts and the other, at the same time, for tapping nuts, and the entire mechanism can be easily attended to by one or more operators.

45,453.—Signal Tower.—B. P. Lamason (assignor to himself and Sidney D. King), Alexandria, Va.:

First, I claim the extensible and contracting frames, C c, employed in combination with the connecting platforms, D, and movable sills, E, the whole being constructed and arranged to operate in the manner herein set forth.

In combination with the above, I claim the right and left screw, F and crank, H, together with the shaft, I, and gears, J, when arranged to operate in the manner and for the purpose herein described.

45,444.—Device for Plowing in Stubble.—Josiah Kilmer (assignor to himself and Augustus Kilmer), Cobleskill, N. Y.:

I claim the application to a plow beam, B, and double tree, G, of a drag chain, A, substantially in the manner and for the purpose set forth.

45,455.—Engine Turning Lathe.—Charles W. Dickinson (assignor to himself and Geo. Rowden), Newark, N. J.:

I claim, first, The combination of the sliding cams, n, adjustable frame, e, and tool plate, 10, substantially as and for the purpose set forth.

Second, The combination of the eccentric, Q, the adjustable frame, e, and the shaft, O, substantially as and for the purpose set forth.

Third, The combination of the eccentric, Q, one or more of the cams, n, or their equivalent, and the vibrating frame, e, and connecting parts or equivalent device for combining the motions by the eccentric and the cams and transmitting the same to the engraving tool.

Fourth, The combination of the engraving tool, 5, the gage, 7, the bell crank, 29, or its equivalent, and the eccentric, Q, substantially as and for the purpose hereinbefore stated.

Fifth, The combination of the engraving tool, 5, the gage, 7, the bell crank, 29, or its equivalent, and one or more of the cams, n, connected as described, or its manner equivalent, substantially as and for the purpose set forth.

Sixth, The combination of the cams, n, or any two or more of them, the adjustable stops or touches, l, or any two or more of them, and the slide, k, and the latter is connected to the engraving tool, substantially as described, to the effect hereinabove stated.

Seventh, The adjustable stops or touches, l, or any two or more of them, connected to the engraving tool and the face-plate, or its equivalent, on which the work is to be mounted, of the doubling clutch, 21, 22 and 23, substantially as and for the purpose described.

Eighth, The arrangement in the engraving tool, 5, platform, 4, eccentric, Q, and cams, n, or equivalent device, the parts being connected substantially as and to the effect stated above.

Ninth, The combination of the frame, e, performing one or more of the adjustable bearings, s and f, and one or more of the vibrations of the engraving tool, 5, for modifying the motions to be imparted to the engraving tool, substantially as set forth.

Tenth, So constructing the adjustable bearings, e or f, and either of them, or so combining therewith the frame, e, and the armed shafts, a and b, or either of them that the motion given to one of the said shafts may be neutralized upon the frame, e, substantially as set forth.

45,456.—Apparatus for Carbureting Air.—Hugh L. McAvoy (assignor to himself and Elias S. Hutchinson), Baltimore, Md.:

First, I claim carbureting air by means of a revolving volatile wheel, B, operating within a vessel or reservoir, A, substantially as described.

Second, I claim the use of the journal, D, made smaller than its bearing, D', to permit the oil to be returned from the gas chamber, E, to the vessel, A, as herein set forth.

Third, I claim the employment in connection with the vessel, A, and wheel, B, of a valve, H, adapted automatically open, when the apparatus is in operation, for the purpose of supplying air to be carbureted to close when the operation is suspended, in order to prevent the oil from evaporating as explained above.

Fourth, So constructing the adjustable bearings, e or f, and either of them, or so combining therewith the frame, e, and the armed shafts, a and b, or either of them that the motion given to one of the said shafts may be neutralized upon the frame, e, substantially as set forth.

Fifth, As means for returning the oil from the chamber, E, to the vessel, A, and to be especially available when such oil is in excess, I claim the pipe, F, arranged and employed in the manner described.

45,457.—Wood-bending Machine.—James N. Ray (assignor to himself and John M. Wheatley), of Indianapolis, Ind.:

First, In a wood-bending machine I claim the flexible groove formed by fixing upon the face of a plain strap of flexible metal two rows of segments of any suitable material, so shaped as to form the walls of the groove, whilst the strap itself forms the bottom thereof, substantially as herein set forth.

Second, In the combined use of the bending strap and back strap, substantially as herein set forth.

Third, I claim the combined use of the clip, the perforated back strap, the rod, G, the clamp and the wedge, as a means of holding the bent handle until it is cool and firmly set, substantially as herein set forth.

Fourth, I claim the forms, E, when attached to the head, F, and used to tread upon the segments or upon the strap outside the segments, substantially as herein set forth.

Fifth, I claim the writing, I, in combination with the forms, E, when used to make the forms more horizontally, and to prevent them from rising from the bench in the act of bending, substantially as herein set forth.

Sixth, I claim the combined uses of the head, F, the forms, E, and the follower, D, substantially as herein set forth.

45,458.—Clothes Pin.—Henry W. Sargeant (assignor to himself and G. Brayton Johnson), Boston, Mass.:

I claim constructing a clothes pin with two rigid outside prongs, b b, and a flexible tongue, c, between them, substantially as set forth and for the purpose described.

45,459.—Screw Plate.—James Smith (assignor to himself and Major Smith), New Haven, Conn.:

I claim the herein described screw plate constructed and operating substantially as and for the purpose specified.

45,460.—Manufacture of Coal Gas for Illumination.—J. W. Smith (assignor to himself and Jonas Greene), Washington, D. C. Ante-dated Oct. 17, 1863:

I claim making coal gas by charging the retort with coal and heating in the usual way for two hours, and at the end of this time supplying the gas tar thus far made in the operation through reservoir, B, substantially in the manner and for the purpose set forth.

45,461.—Printing Press.—Franklin L. Bailey, Boston, Mass.:

I claim, first, The application of one or more movable slides or tables, to the cylinder, C, for the purpose described, when these movable tables constitute a part of the distributing surface over which the rollers, r r, roll and spread ink.

Second, I claim the means of effecting the movement of these tables, I, the same being the gear, 4, and gear, 5, connection, 6, and forked lever, 7, substantially as described.

Third, I claim the combination of the dogs, D D, with the cylinder, when such are arranged so that they cylinder by the same means that restrain or close them, for the purpose set forth.

Fourth, I claim the combination of the connections, c c, and joints, w w', when the swivels, E E, when these swivels are made to vibrate on their axes, e e', and fold the connections, c c, down on to them for the purpose set forth.

Fifth, I claim the herein described method of vibrating the swivels, E E, by means of the sub-connections, c c', and their shaft, g.

45,462.—Sub-caliber Rifled Projectile.—J. L. Henry, of the State of Kentucky:

First, I claim so combining a projectile with a metallic sabot so to cause it to fly off on leaving the gun by a force other than the action of the atmosphere alone, substantially as described.

Second, Securing the sabot to the shot by a device which shall be broken or destroyed on firing, thereby leaving the sabot free to drop from the projectile after leaving the gun, substantially as described.

Third, The combination of a ring, H, with the disk of a sabot or base of a projectile, for the purposes and substantially as set forth.

45,463.—Ejector for Oil Wells.—J. D. Angier and Frederick Crocker, Titusville, Pa.:

We claim the employment of the deflector in combination with the two tubes and annular projection, substantially as described for the purpose set forth.

45,464.—Ejector for Oil Wells.—Geo. M. Mowbray (assignor to J. D. Angier and F. Crocker), Titusville, Pa.:

I claim the employment, in combination with the blast tube and deflector, of an adjustable bulb, or its equivalent, substantially as described and for the purpose set forth.

RE-ISSUE.

1,833.—Process of Treating Steel to render it Tougher, Stronger and more Elastic.—William Hazen, Milwaukee, Wis. Sept. 20, 1864:

I claim, first, The treatment of steel so as to render the same tougher, stronger and more elastic by immersion in a bath or solution of combined chemical agencies, substantially as described and for the purpose set forth.

Second, The process of treating steel by the combination of aqua ammonia, sulphate of iron and sal ammoniac in solution, substantially as described and for the purpose set forth.

DESIGNS.

2,006.—Cook's Stove.—E. J. Cridge, Troy, N. Y.

2,007.—Table of a Mustard Box.—Samuel Crump, Jr. (assignor to Beards & Cummings), New York City.

2,008 to 2,012.—Carpet Patterns.—Elemir J. Ney (assignor to the Lowell Manufacturing Company), Lowell, Mass. (Five cases.)

2,013 to 2,015.—Stove plates.—Nicholas S. Vedder, Troy, N. Y. (Three cases.)

MONEY RECEIVED

At the Scientific American Office, on account of Patent Office business, from Wednesday, Dec. 7, 1864, to Wednesday, Dec. 14, 1864:

E. B., of Mass., \$25; C. H. H., of N. Y., \$25; U. S. B. Co., of N. Y., \$30; W. C., of N. Y., \$25; E. P. B., of Conn., \$40; C. S., of N. Y., \$25; L. S., of N. Y., \$20; S. S. F., of Pa., \$50; E. D., of Me., \$30; Mrs. J. B., of N. Y., \$41; E. N. F., of Mass., \$15; J. J. I., of N. Y., \$40; A. T. B., of N. Y., \$15; S. C., of N. Y., \$20; J. T. R., of N. J., \$15; T. L., of N. Y., \$45; J. P. H., of N. Y., \$20; G. I. M., of Conn., \$50; E. D. of N. N., \$20; J. L., of Mass., \$15; T. & W., of Pa., \$20; T. W. H., of Wis., \$20; A. G. W., of Cal., \$20; R. T. M. W., of Vt., \$30; T. & J. C., of Mich., \$20; A. S. H., of N. Y., \$20; G. P., of Mass., \$45; P. S., of N. Y., \$20; A. H. W., of Iowa, \$20; J. W., of Mass., \$45; B. F. C., of N. Y., \$20; N. B. B., of N. Y., \$21; E. W. G., of Ill., \$15; P. & K., of N. J., \$45; J. J. of Mass., \$62; A. K., of Pa., \$10; W. T., of N., \$20; C. & M., of Mass., \$20; T. E. R. of N. Y., \$20; S. R., of Ark., \$20; C. F. T. of N. Y., \$20; J. W. N., of Conn., \$20; J. C., of Mass., \$20; J. H. P., of N. Y., \$20; R. S. F., of N. Y., \$20; S. & A., of N. Y., \$20; D. P. D., of N. J., \$22; G. W. P., of N. Y., \$20; D. B. N., of Ind., \$20; W. T., of Ill., \$20; A. H., of Pa., \$45; R. V. J., of Ohio, \$20; J. T. Van D., of N. Y., \$20; W. G. S., of Pa., \$20; T. M., of N. Y., \$15; H. H. E., of Conn., \$20; N. P. O., of N. Y., \$15; T. H. W., of Pa., \$20; L. S. E., of N. Y., \$16; J. W. Jr., of Wis., \$32; S. P., of Ohio, \$16; W. & R., of C. F. T., of N. Y., \$20; R. H. K., of N. Y., \$15; I. J., of Ill., \$30; S. G. G., of Ohio, \$25; W. B., of N. Y., \$30; S. N. S., of Ohio, \$25; M. S. O., of Ill., \$25; C. B., of N. J., \$15; N. S. T., of N. Y., \$31; T. L. S., of Mass., \$32; J. H. W., of N. J., \$15; W. A. D., of N. Y., \$30; E. C., of Me., \$25; C. B. & W. T. B., of Ill., \$25; S. & L. R., of Pa., \$25; S. & S., of Ohio, \$25; H. H. P., of Ill., \$16; J. G. I., of Ill., \$20; R. & C., of Conn., \$15; H. K., of Conn., \$15; Mrs. J. P., of Mich., \$16; R. V., of Ohio, \$20; W. A., of Ohio, \$16; E. B., of Ind., \$25; J. A. C., of U. S. A., \$40; C. A. of Ill., \$16; T. Van W., of N. J., \$15; C. L. L., of Pa., \$22; L. W. W., of Mass., \$25; G. A., of Oregon, \$20; J. R. S., of Ill., \$12; E. & B., of Me., \$16; J. Z., of Cal., \$100; H. R., of Ill., \$40; F. & L., of Me., \$15.

Persons having remitted money to this office will please to examine the above list to see that their initials appear in it, and if they have not received an acknowledgment by mail, and their initials are not to be found in this list, they will please notify us immediately, stating the amount and how it was sent, whether by mail or express.

SPECIFICATIONS AND DRAWINGS AND MODELS BELONGING TO PARTIES WITH THE FOLLOWING INITIALS HAVE BEEN FORWARDED TO THE PATENT OFFICE, FROM WEDNESDAY, DEC. 7, 1864, TO WEDNESDAY, DEC. 14, 1864:

E. B., of Mass.; C. H. H., of N. Y.; U. S. B. Co., of N. Y.; W. C., of N. Y.; E. P. B., of Conn.; C. S., of N. Y.; L. S., of N. Y.; S. L. F., of Pa.; Mrs. J. B., of N. Y.; J. J. I., of N. Y.; G. I. M., of Conn.; C. T. & W. T. B., of Ill.; L. & L. R., of Pa.; S. & S., of Ohio; W. A. & W. B., of N. Y.; E. C., of Me.; W. B., of N. Y.; W. N. B., of Ind.; S. S. G., of Ohio; N. S., of Ohio; M. S. O., of Ill.; E. B., of Ind.; A. & B. of Me.; J. A. C., of U. S. A., 2 cases; G. K. W., of Conn.; J. W., of Eng.; L. W. W., of Mass.; J. R. S., of Ill.; C. L. L., of Pa.; G. A., of Oregon; J. B. E., of Mo.

TO OUR READERS.

PATENT CLAIMS.—Persons desiring the claim of any invention which has been patented within thirty years, can obtain a copy by addressing a note to this office, stating the name of the patentee and date of patent, when known, and enclosing \$1 as fee for copying. We can also furnish a sketch of any patented machine issued since 1863, to accompany the claim, on receipt of \$2. Address MUNN & CO., Patent Solicitors, No. 37 Park Row, New York.

MODELS ARE REQUIRED TO ACCOMPANY APPLICATIONS FOR PATENTS UNDER THE NEW LAW THE SAME AS FORMERLY, EXCEPT ON DESIGN PATENTS, WHEN TWO GOOD DRAWINGS ARE ALL THAT ARE REQUIRED TO ACCOMPANY THE PETITION, SPECIFICATION AND OATH, EXCEPT THE GOVERNMENT FEE.

RECEIPTS.—WHEN MONEY IS PAID AT THE OFFICE FOR SUBSCRIPTIONS, A RECEIPT FOR IT WILL ALWAYS BE GIVEN; BUT WHEN SUBSCRIBERS REMIT THEIR MONEY BY MAIL, THEY MAY CONSIDER THE ARRIVAL OF THE FIRST PAPER A BONA-FIDE ACKNOWLEDGEMENT OF OUR RECEIPT OF THEIR FUNDS.



ILLUSTRATIONS.

A

Accumulator, power (Smith) 193
Awnings (Armstrong) 241

B

Bed-clothes, attachment for ventilating (Martin) 216
Bell-ringer, steam (Beach) 117
Boat, canal (Heath) 383
Bobbin (Reynold) 328
Bobbin-winder (Kasson) 72
Boiler, steam (Leslie) 192
Boiler, steam (Miles) 63
Booster, for gas (Porter) 223
Boot-drawer and pantaloons' guard (Watson) 352
Bracket, electric (Cornelius & Baker) 328
Bronzing machine (Tapley) 337
Button, spring-catch (Reed & Packard) 264

C

Can, oil (Olmstead) 300
Carine, method of stripping (Todd) 96
Carine, bread-loading (Stevens) 81
Carpet-bag frame (Lagowitz) 384
Chair, railroad (St. John) 96
Chair, planing (Ranney) 291
Churn, oscillating (Lewis) 24
Churn-power (Parker) 160
Coffee-roaster (Burns) 3/2
Compass, liquid ship's (Eitch) 52
Core-making machine (Parmelee) 341
Cultivator adjustable (Doak) 112
Cup, molasses (Cook) 160
Cup, oil (Fogie) 368
Cutter, button-hole (Sanborn) 290

D

Derrick, floating (Collins) 64
Dores, church, improvement in (Wag-
ner) 136
Drill, pocket (Olmstead) 360
Drill, pocket (Raymond) 200
Drilling machine (Lauback) 305
Dryer, grain (Rabillon) 264

E

Elevator, tide-water (Moulton) 256
Engine, air (Brown) 358
Engine, double expansion (Allen) 100
Engine, rotary (Masse) 97
Engine, steam (Carter) 104
Evaporator, Sorghum (Stewart) 177
Evaporator, Sorghum (Bond) 232
Exhaust, variable (Dykeman & Bolton) 248

F

Fagot, (Lewis, Price & Naylor) 249
Fastener, door and window (Wilkinson)
Flour, machine for packing (Brown) 32

G

Gold washer and separator (Hicks) 144
Governor (Kelly & Lamb) 344
Governor, water-wheel (Gillespie) 376

H

Hammer, atmospheric forge (Hotchkiss)
289
Horse-power machine (Hunt) 176
Horse shoe (Ouster) 46

K

Knife, grafting (Jackson) 184

L

Lamp, the "Union" (Union Lamp Co.)
112
Latch-adjustable gate (Williams) 164
Lathes, attachment for centering and
squaring (Newell) 401
Lather rest (Twamley) 152
Lock, car (Lyon) 134
Lock, book (Burdick) 66
Lubricator (Ross) 216
Lumber measure (Old) 321

M

Manure-spreader (Eley) 56
Mill, adjustable sugar-cane (Porter) 225
Mill, army and engineer (Sedgobro) 708
Musket canopy (Thompson) 53
Musketos net, portable (Zengeler) 64

O

Oil-stone fountain (Funk) 376
Oil-wells, apparatus for (Hobbs) 400

P

Packing, piston (Abbe) 56
Paddle, feathering lever (Harris) 88
Paint-brush guard (Heslerick) 136
Planing machine, single (Woolsey) 36
Plow, light-draught (Tollinson) 128
Pocket-Knife (Gardner) 81
Potato-boiler (Britain) 8
Press, beater bay (Miller) 360
Press, copying (Tait) 163
Press, improved printing (Potter) 145
Pump, cattle (Dickson) 280
Pump, deep-well oil (Warren) 260

R

Rail, steel-capped, and improved spike
(Teller) 304
Rake, horse-hay (Hussey) 296
Rifle, breech-loading repeating (Appleby)
49
Rorgulf fold for ships (Bowdlear) 272

S

Safe, coin (Howard) 272
Salt, economical method for manufac-
turing (Chapin) 257
Saw-cross-cut, arrangement for (Berry)
161
Sitter, wagon-box (Pearse) 353

Separator, grain (Patterson) 72
Sewing machine, pocket (Heyer) 60
Scale, hydrostatic (Amadan) 4
Sewer, boiler (Cooper) 16
Shaving apparatus, heating and (Bourne)
328

Shirt front, metallic (Brady) 320
Shot and shell (Pfund) 406
Skate, self-fastening (Forbes) 312
Sled, coasting (Hunt) 113
Slice, vegetable (Morahan) 153
Spirits of turpentine, process of making
(Gill) 216
Spoon, mustache (Patterson) 385
Spray, door (Worcester & Jones) 232
Stave-dressing machine (Palmer) 40
Stop, window-sash (Shaw) 200
Stop-motion, fulling-mill (Stott) 395
Stove hook (Reynolds) 400

T
Tile, drain, machine for making (Brails-
ton) 129
Tobacco-cutter (Smith) 273
Traction-hoist and back (Catlin) 248
Trap, steam (Vasson) 112
Treadle motion (Kaefer) 17
Truck, railway (Frost) 336
Trunk (Lee) 104

V
Valve, balanced (Davis) 48
Valve, balanced slide (Barrel) 120
Valve, globe (Lunkenheim) 322
Valve, self-acting, safety (Huntington)
190

W
Washing machine (Adams) 120
Washing machine, paragon (Doty) 224
Witch, a (Kingsley) 21
Witch, ball (Kimball) 384
Wheel, adjustable issue (Dickson) 132
Wheel, paddle (Comstock) 88
Wheel, paddle (Amen) 129
Wheel, water (Tyler) 289
Wheel, water, rectifying (Luther) 80
Wheel, wind-self-regulating (Burnham) 1
Work-holder, sewing (Scotfield) 406
Wrench, adjustable (Penney) 362

MISCELLANY.

Figures followed by asterisk (*) refer
to illustrated articles.

A
Agricultural Department, bi-monthly
report of 16, 50

Air, foul, safety apparatus in 243

Air, purity test of 286, 358

Albatross, flying of the 374

Albermarle, the, blowing up of 330

Alchemists, marvels of the 71

Alloy, a new 91

Almanac, curious ancient 83

Almond, tin cans as an application
for 131

Aluminum bronze, surgical instruments
constructed of 20

Aluminum, reducing, by zinc 154

Almond, the way procured 130

Amber 131

Anchors, strength of 291

Animal life, California, waifs of 42

Animal, grafting 128

Annealing 163

Annunciator, electric, a new 315

Ants, California 132

Ants, the way they destroy 166

Avril block, casting of a 160-ton 149

Apple-butter, how to make 338

Army corps, a new 40

Army, to prevent recklessness in the 41

Artisan well of Grenelle at Paris 193

Artesian wells, boring 340

Artesian wells, large 132

Asafetida in Afghanistan 67

Asphalt mines and springs in Santa
Barbara county 404

Astrakhan, what is 34

Automobile, alternative sizes of 35

Automaton, a smoking 216

Azeline, preparation of 101

B
Bags 75

Balls, tree, the 38

Balloon, fire, a trip in a 122

Baloon, spent, how to burn 212

Bamboo, the, philosophy of 54

Barnum's Museum 404

Barometer, a forty-foot 342

Barrel, hermetical 288, 359

Barrel, petroleum 292

Battery, railroad 23

Beans, Calabar, poisoning by 261

Bee-tree, a petrified 83

Beech, a new 359

Beef-packing, great improvement in 354

Beefsteak, to fry a 173

Beet, adulterated 266

Beet, the sugar, in Illinois 115

Bells, English peals of 55

Bells, new alloy for 179

Benzine and benzole 249

Benzine, new facts about 189

Birth in Central Park 297

Bismuth 324

Blacking, Day & Martin's 295

Blast, a large 37

Blockade running, profits of 234

Boat, new submarine 183

Boat, Russian submarine, some details
of 163

Boat, propelling, by drawing a column
of water astern 164

Boilers, cast-iron 307

Boilers, cylinder, good suggestions
about 163

Boilers, steam, Colburn on 298

Boilers, steam, cost of in Dixie 93

Boilers, water, Fairburn on 34, 53, 66, 82

Boilermakers, the calorimeters of 180

Bones 115, 153

Boots, skating and other, corrugated
lacing for 106

Boots, why they should be polished 301

Box, a "tricky" 388

Brandy, substitute for, in cases of ex-
haustion 35

Bread, cheap 82
Bread, home-made and baker's 176
Bread, new method of making 21
Breadstuffs at last 281

Bromo, bromine, aluminum 362

Bronze dip, brown, for coating hat
hooks 240

Bulbs, winter flowering 360

Bullets, whistling and blazing carb-
tridges 263

Butler, General, an inventor 82

Butter, action of, on copper 66

C
Cables of the world, submarine 16

Cadmium, to prepare iodide of 307

Calculating machine at Dudley Obser-
vatory 39

Calculations, curious 199

Candy, a new 240

Metal, casting one, with another 403

Metalworking 25

Metals, manipulation of 163

Metrical system, British association on the 283

Mexico, old mines of 113

Mica, ornamental use of 8

Milk, condensed 284

Mines before Petersburg, how constructed 183

Mine, great silver-lead, in Wales, 123

Minerals of Ceylon 341

Minerals, valuable, in California, 405

Mines in warfare 121

Mines, lighting 184

Mines, of Mexico 116

Mines, school, in Columbia college 330

Mining machinery, improved 200

Mining work, great 303

Minium iron 397

Mirrors, repairing 154

Mistakes, the, on a lamp chimney 217

Molasses, 200

Molasses, making, from corn 338

Molasses, the U. S. iron-clad 288

Money order system, the 276

Money orders, postal 375

Monitor triumph in Mobile bay 153

Monitor system, the 98

Monitors, Russian 148, 265

Monitors, the, how the Russians regard 167

Monitors, the light-draught, Donald McKay and 91

Monitors, what correspondents say of the 167

Motive power, the products of combustion for 105

Musical notes, machine for registering 366

N

Naphtha in paint 170

Nature, silence in 89

Navy, aerial 192

Navy, Donald McKay's defense of 306

Nerves, re-union of dismembered 118

New York city, valuation of 179

New York harbor, the defense of 90

Newspaper, the first 152

Not in anger 90.

Oil, boring for, near Chicago 358

Oil entering a steam cylinder against pressure 212*

Oil lake in Trinidad 49

Oil refining 150

Oil seeds, African 338

Oil well, how bored 225*

Oil well, what costs to sink an 247

Oil well, sharp practice at 265

Olive oil, vinegar and 42

Ordnance, armor plates and 279

Our burden and our strength 198

Overwork 296

Oxygen gas, obtaining 149

P

Paints, marine 230

Paper and cloth from corn husks 87

Paper from corn husks 25, 150

Paper stones 83

Panama, the oil wells 299

Patent, a foreign 35

Patent case, great paraffine oil 1

Patent claims 10, 26, 43, 58, 75, 82, 107, 123, 139, 155, 165, 202, 218, 234, 251, 267, 288, 299, 315, 331, 346, 363, 375, 395, 408

Patent fire-escape, heavy verdict 363

Patent-offices, statistics 99

Patents, extension of 313

Patents, interesting English 311

Patents, re-ut American 7, 23, 42, 51, 70, 107, 123, 159, 178, 199, 218, 234, 260, 268, 282, 299, 311, 327, 342, 363, 374, 395, 403

Patents, re-ut English 245, 303

Patent-cases 47

Patent-factory in Ceylon 117

Patent, how obtained 241

Pendulum, the wheel 325

Percussion caps, dangerous 80

Perfumery 92

Perfumery, Bradal's 36

Perforation, checking 113

Petroleum 329

Petroleum as a fuel 245

Petroleum as salid oil 323

Petroleum for generating steam 19

Petroleum in wool-spinning 138

Petroleum, novel apparatus for raising 213

Petroleum, the geology of 308

Petroleum, the rock in which found 314

Petroleum, the rock through which pipes 118

Phosphorus—will it set woⁿ fire? 407

Photographic baby, a 370

Photographic items 51, 96, 102, 118, 134

Photography, improvements in 377, 398

Photography—"put some ice in it" 259

Photography without nitrate of silver 219

Photographs 23

Photographs, diamond cameo 307

Photolithography, Osborne's process of 324

Phrenological bust 263

Pickles, makers, profits of 304

Pickles, Yankee 250

Pill-counting machine, a 164

Pipe, tobacco, patent breech-loading 19

Plants, respiration of 42

Plates, armor, and ordnance 23

Plates, drilled v. punched 195

Plates, steel, a 370

Plates, steel, wanted in Louiana 37

Plumbago on Lake Superior 9

Pneumatic deflection, reams 1 table 310

Pneumatic dispatch in Liverpool 67

Pneumatic Railway, the 276

Polytechnic Association 6, 285, 213, 227, 269, 276, 292

Porcelain manufacture, introduction of the 372

Porcelain, cutting up 343

Pork, raw, beware of 330

Portraits, new method of taking 24

Potatoes, ching, with straw 31

Potatoes, preserving in molasses 225

Potatoes, scoring 233

Potatoes, sweet, in place of hyacinths 239

Potatoes, use: res of earthing up 215

Poeder, mini. g., increased explosiveness of 162, 210

Poeder, effervescent 161

Poeder, concentration of 19

Poeder, the tumbling in 231

Poeder, to prevent from fading 113

Printing, new method of 51

Promises of compensation in 700

Prisoners of war, what may be sent to, by their friends 401

Projectiles, the tumbling of 230, 256, 255

Propellers, screw, 83

Ptolemy, theory once taught in Yale College 263

Pt. 100, cone, rule for calculating size of 136, 273

Pulleys, cone, sizes for 13*

Pump propulsion for boats 103

Ptyphorus, Homberg's 273

Quicksilver, how to test 311

R

Railroad cupboard, a 244

Railroad system, the, of the United States 356

Railroads, British 165

Railroads, broken, how Lee repairs 36

Railroads, dust on 181

Railroads, English and American 169

Railroads, units of city 91

Railways, atmospheric 210

Rams 344

Rams, the Laird 224

Rat riot, the 138

Reading, desultory 371

Reclamation 401

Report, size of Navy 388

Report of Sec. of Treasury 329

Restaurants, French, curiosities of 375

Rice-paper of Formosa 194

Rifle, Berdan's breech-loading 343

Rifle-shooting, American 73

Rifles, breech-loading, repeating 89, 325

Rifles, gun 194

Rifles, tamping 102

Rifles, tamping, off-hand 102

Rifles, breech-loading, reporting 89, 325

Rifles, gun 194

Rifles, tamping 102

Rifles, breech-loading, reporting 89, 325

Rifles, gun 194

Rifles, breech-loading, reporting 89, 325

Rifles, gun 1

Collars, enamelled, fabric for manufacture of 40
 Comb, toilet 156
 Compass, mariner's 236
 Composition, fire-proof, for crucibles, &c. 60
 Composition for coating metals 44
 Composition for coating oil barrels 307
 Composition for lining oil barrels 60
 Composition for making barrels water and oil tight 44
 Composition for preserving fruit trees 40
 Compound, medical 199
 Compound, tanning 204
 Condenser 409
 Condenser, hydro-atmospheric 186
 Condenser, refrigerating, for distillers 333
 Condensing apparatus 44, 415
 Conductor, submarine shot 287
 Concentrator, metallic 190
 Cooler, atmospheric 283
 Cooler, water 332
 Copper, process for engraving 379
 Corkscrew 563
 Cork, &c., machine for weaving 156
 Cords, ropes, &c., machine for manufacturing 45
 Cork wood, machine for slicing 95
 Corks, machine for trimming 140
 Corn, machine for separating 186
 Corset, skirt-supporting 156
 Cotton and other fibrous material, machine for preparing 396
 Cotton gin, roller for 343
 Cotton, machine for spinning 188
 Cotton machine, slivin rolls for 317
 Cotton picker 301
 Cotton, 4c., machine for weaving 156
 Coupling, &c., machine for manufacturing 45
 Coupling, carriage 300
 Coupling, hose 200
 Cover, embossed, for books 44
 Cradle 44
 Cradle, folding 156
 Cravats, vulcanized rubber 77
 Crimper, knife, fork and pie 283
 Crushers, rock and ore 251
 Cultivator 12, 43, 44, 56, 107, 140, 156, 253, 284, 347, 348, 380
 Cultivator, combined seeder and 108, 126, 288
 Cup, oil 219
 Curry-comb 43
 Cutlery, table, manufacture of 124, 188
 Cutter, card 282
 Cutter, feed 288
 Cutter, hay and straw 186, 188, 202, 251, 408
 Cutter, meat 251
 Cutter, self-feeding tobacco 410
 Cutter, vegetable 384
 Cutter and grater, meat and vegetable 140
 Cutter, straw, affixing knives to 409
 Cylinders, apparatus for boring 219

D

Dancer, automaton 123, 254
 Damper, 124, 347
 Damper and register, ventilating 187
 Damper, automatic, air for hot water heating apparatus 188
 Derrick 40
 Desk, best, school 380
 Desk, writing 141
 Desks, arrangements of, for school rooms 18
 Detector, low water, for steam boilers 36
 Detergent 43
 Disease, improvement in vacuum apparatus for treating 203
 Dish-pan 44
 Door-knobs, mode of attaching, to their spindles 27
 Door, locking, for railroad cars 364
 Door sheave 1
 Door, button for 236
 Door, weather strips for 233, 232
 Double-headed 124
 Dough, machine for mixing and kneading 44
 Dove-tailing machines 124, 306
 Drain 348
 Drill 28, 107
 Drill, grain and planter 396
 Drill, pneumatic 283, 316
 Drill, steel 60, 354
 Drill, seed 27, 193, 396
 Drills, twist, machine for making 187
 Dryer, clothes 3, 2
 Dryer, grain 2, 231

E

Egg-beater or agitator 395
 Egg-fryer 316
 Ejector for oil wells, 203, 316, 384, 4, 0
 Elevating and transporting device 26
 Elevating jack 28
 Elevator 2, 9
 Elevator, brick and mortar 252
 Elevator, grain 1, 396
 Elevator, hay 100, 284
 Elevator, for packages 380
 Elevator, water 50, 140, 186, 220, 234, 236, 251, 267, 300, 316, 396
 Engine, blowing 107
 Engine, combined air and steam 124
 Engine, gas 233
 Engine, hot air 33
 Engine, locomotive 155
 Engine, oscillating 304
 Engine, pumping 491
 Engine, rose, for ornamenting glass 236
 Engine, rotary 103, 109, 204, 217, 220
 Engine, steam 12, 25, 15, 141, 219, 315, 363
 Engines, steam and other, packing for stuffing boxes of 233
 Engines, steam, piston for 266
 Envelope blanks, ginning and feeding 409
 Envelope, expansive 141
 Envelope, paper 381
 Envelopes, device for folding 12
 Envelopes, mode of cutting, from sheets of paper 186
 Envelope, paper, for apparatus for cutting and creasing 260
 Eradicator, 1, 223
 Escutcheon, safety, for locks 59
 Evaporation, sugar, skimming attachment for 109
 Evaporator 348
 Evaporator, for saccharine juices 108, 102, 202
 Evaporator, sorghum 38, 190, 303, 409
 Evaporator, sugar 325, 315
 Evaporators, sugar, skimming for 205
 Excavator 43
 Excavator, submarine 107
 Exhaust, variable, for locomotives 59
 Extractor, cartridge, for fire-arms 364
 Extractors 380
 Eyelet, iron, for saccharine juices 108, 102, 202
 Eyelets, machine for making 253
 Eyeletting machine 123

F

Fabric, gathered 156
 Fabric, bituminous roofing, print for 38
 Fan, automatic 252
 Fan, ladies' 204

Fan power 410
 Fastener, ear spring 187
 Fastener, door and window 204
 Fastener, key 84
 Fastener, paper 84
 Fastening, bedpost 202, 409
 Fastening, blind and shutter 60
 Fastening, blind-alat 189
 Fastening, car sash 379
 Fastening, carpet 234
 Fastening, catch or, for breastpins, ear-rings, etc. 347
 Fastening, gate 264
 Fastening, gate block 220
 Fastening, sash 76, 233, 346
 Fastening, scythe 239
 Fastening, skate 59, 180
 Fastening, whip-socket 155
 Faucet, basin 109
 Faucets, flexible lined 251
 Faucets, flexible machine 219
 Feathers for beds 204
 Feed rack 76
 Feldspar, treating, to obtain useful products 60
 Felting, tightening 108
 Felting machines 346
 Fence, board, board-holder in making 344
 Fence, farm 69
 Fence, field 365
 Fence, portable 44, 332
 Fences, device for stretching the wires of 204
 Fertilizer 92
 Fertilizers, distributing 268
 Fiber, vegetable, composition for preserving and water-proofing 218
 Fibers of hemp, etc., mode of separating 235
 Fibrous materials, machine for surface sizing 124
 File 44, 380
 File 383
 File for dressing metal 236
 File, letter and music 395
 File, for raising, mode of hardening and filing 39
 File, handle for 186
 Files, machine for cutting 267, 332
 Files, round and half round, construction of 124
 File-hook 44
 Filter 204
 Filter, sand cooler 252
 Fire-arm 141
 Fire-arm, ball screw for 267
 Fire-arm, bullet for 237
 Fire-arm, double-barreled breech-loading 140
 Fire-arm, breech-loading 26, 75, 109, 125, 166, 177, 180, 219, 252, 300, 316, 332, 349, 360, 361, 381
 Fire-arm, combined sword handle and revolving 219
 Fire-arm, magazine, cartridge retractor for 399
 Fire-arm, magazine, cartridge retractor for 399
 Fire-arm, patched ball for 76
 Fire-arm, revolving 76, 106, 220, 234, 331, 380
 Fire-arm, revolving, safety-stop for 190
 Fire-arm, self-loading 343
 Fire-arms, adjustable sight for 396
 Fire-arms, cartridge retractor for 60
 Fire-arms, projectiles for 347
 Fire-arms, revolving, cartridge for 336
 Fire-arms, revolving, safety-stop for 190
 Fire-escape 210, 331
 Fire-place and furnace 349
 Fire-plugs 236
 Fire-pot, soldering 364
 Fireworks, machine for charging 268
 Fishing rods, attaching reels to 0
 Fixture, curved or shade 267, 397, 409
 Flannel, etc., machine for dyeing 285
 Flash or return 10
 Flax, machine for breaking and cleaning 190, 233, 236
 Flax, tangled, machine for scutching 380
 Floating device 141
 Floor cloths, leather-paper for 28
 Flour cloths, machine for making 124
 Flour, rice, means of utilizing 205
 Fuel, peat, apparatus for preparing 189
 Furnagator 103
 Furnagator for smoking bees 335
 Furnace 251, 284, 301
 Furnace and cupola 347
 Furnace, blast 1
 Furnace, blast 220
 Furnace, heat 201
 Furnace, home-warming 219
 Furnace, improved, for clarifying cider 302
 Furnace, pudding 141
 Furnace, pudding, application of hot blast to 396
 Furnace, soldering 363
 Furnace, wood, upon coal oil 19
 Furnaces, blast, tube for 124
 Furnaces, hot water, boiler for 189
 Furniture, caster for 140
 Furrowing device 268
 Fuse, combined time and concussion, 189, 316, 363
 Fuse, combined time, percussion and concussion 262
 Fuse, safety 363

G

Gage, bilge water 234
 Gage, pressure 346
 Gage, syrup, for bottling soda 28
 Gage, steam pressure 379
 Gage, water 44
 Gage, water alarm 365
 Garments, horse hair woven 365
 Gasket, automatic 347
 Gate, farm 219
 Gas, apparatus for inhaling 180
 Gas, apparatus for manufacturing 107
 Gas, apparatus for separating and collecting from petroleum 235
 Gas, coal, manufacture of, for illumination 410
 Gas, illuminating, manufacture of, from peat 76
 Gas, lighting, by electricity 283, 379
 Gas, waste, mode of utilizing 396
 Gases from petroleum and other wells, device for collecting 10

Gear, pump 45
 Gear, variable valve 355
 Gear, valve, for steam engines 58, 123, 180
 Gear, variable, 124, 202, 267, 316, 347
 Glass, device for cutting 250
 Glass, kiln for annealing 26
 Globe, school, mold for making 43
 Gloves, machine for cutting out 364
 Glue 251
 Glue, apparatus for heating 124
 Gold and silver, apparatus for amalgamating 309, 316, 378, 386
 Gold, silver, mode of separating, from ores 219
 Gold, apparatus for washing and amalgamating 76
 Gold, siphon for separating, from crushed quartz 188
 Governor 219, 236
 Gradients, apparatus for descending 232
 Grating and band-grinding machine 44
 Grating, apparatus for steaming 202
 Grain bag 75
 Grain, distributing, in mills 10
 Grain, measured, machine for registering 4-9
 Grain from cars, unloading 331
 Grain, steaming, in process of grinding 219
 Grater, nutmeg 316
 Grater, apparatus for raising 315
 Grates, stove 233
 Grindstone, artificial 329
 Grubbing machine 378
 Guard, lantern 253
 Gun barrels, scraper for cleaning 76
 Gun, battery 156
 Gun carriage 26
 Gun cleaner 347
 Gun lock 203
 Gun, toy 107
 Gunpowder, manufacture of 206
 Guns exhausted of air, muzzle cap for 107
 Guns, mounting heavy 27
 Gun carriages, operating 11
 Guns, planing the rim-bases of 59

H

Hair, injector for the 391
 Hair, process for treating 58
 Hair pin 44
 Halter, horse 124
 Halter-holder 93
 Hammer, large 365
 Hammer, stone 253
 Hammer, steam, valve gear for 76
 Harness, breast strap shield for 190
 Harness, cart 203
 Harness, loom, machine for weaving 203
 Harness, snap 381
 Harness, weaver's machine for dressing 190, 191
 Harness 11
 Harrow, rotary 108
 Harrow with 50
 Harvest, 21, 27, 28, 59, 61, 108, 189, 203, 205, 218, 236, 251, 269, 285, 315, 316, 331, 332, 347, 348, 365, 379, 380, 396, 408
 Harvesters, binding attachment to 190
 Harvesters, cutting apparatus of 76
 Harvesters, driving wheel of 301
 Harvesters, raking attachment to, 60, 233, 363
 Hat bodies, apparatus for stretching 236
 Hat bodies, composition for stiffening 10
 Hat, cork 331
 Hat, paper pulp 284
 Hat, spring brim 331
 Hat, sun, bonnet, apparatus for press-ing into 216
 Hats, looms for weaving 365
 Hay and other materials, mode of baling 59
 Hay and other materials, machine for baling 59
 Hay, constructing bales of 380
 Hay, &c., curing and drying 43
 Hay, derricks for stacking 116
 Hay-machine for loading 27, 186, 252, 408, 409
 Hay, machine for preparing, for press-ing into bales 390
 Hay, glue and water 219
 Heater, sad-iron 236
 Heater, steam, regulating apparatus for 202
 Heater, water 233
 Heating apparatus 232, 408
 Heat-cutting machine 10
 Heals, mode of breasting 236
 Hides, machine for tanning 12
 Hinge, 107, 109, 267
 Hinge, butt 107
 Hinge, stop 189
 Hood, bell puller 141, 187
 Hoist-cleaning machine 187
 Hoisting apparatus 44, 190, 316, 347
 Holster 121
 Hood, ladies' 76
 Hook and eye 300, 400
 Hook, check 140
 Hook, coat and hat 316
 Hook, fish 220
 Hook, snub 409
 Hooks and eyes, machine for separating 379
 Hooks, whale-tree, improvement in 202
 Hoops, flaring metal 346
 Hoops, machine for shaving, for casks 232
 Hop frame 190
 Hop-pot, machine for sharpening 76
 Horne-cover 289
 Horse-holder 186
 Horse-shoe 109, 237, 390
 Horse-shoe 25, 93, 157, 267
 Horses, apparatus for throwing 268
 Horses, clipping the hair of 202
 Horses, vicious, apparatus for handling 269
 Horse-shoes, machine for making 186, 301
 Horse-shoes, removable corks for 109
 Hose connection 237
 Hose, a.c. india-rubber, machine for making 204
 Hose, valve arrangements for 281
 Hub-band, carriage 11
 Hubs, wagon, machine for boring 300
 Hydrometers 236

I

Ice, cutting, for storage 251
 Ice cream machine 315
 Ice, device to prevent slipping on 332
 India-rubber, mode of enlaying and ornamenting articles of 107
 India-rubber over-shirt 76
 India-rubber, hydraulic 331
 Indicators, water 395
 Inhalator 61, 204
 Ink roller, printers' 10
 Ink stand 408
 Ink stand, pen-cleaner, a.c. 234
 Ink wells, fastening the covers of 284
 Insects and vermin, apparatus for destroying 220
 Iron 14, 20, 203, 204, 217, 220
 Iron, composition 16
 Iron, composition for carbonizing 100
 Iron, malleable, manufacture of 76
 Iron, method of attaching steel to 284
 Iron, preserving, from corrosion 77
 Iron, process of hardening 123
 Ironing machine 284

J

Jack, hydraulic 220
 Jars, liquid, measuring nozzle for 108
 Jars, preserve 284
 Jars, stopper for 315
 Journal, railroad car 349

K

Key button 284
 Kiln for annealing glass 26
 Knapsacks 323
 Knapsacks, mode of carrying 220
 Knapsacks, soldiers' shoulder-brace for 348
 Knife, cigar 139
 Knife, for nurseryman 186
 Knife, pocket 45
 Knitting machine 10, 237, 252
 Knitting machine, circular 23, 316
 Knitting machine, circular, take-up of 331
 Knob, mode of attaching, to spindles 76

L

Labels or tags 347
 Labels or tags machine for cutting and punching 45
 Lacings, machine for cutting 203
 Ladder, fire escape 12, 44
 Ladder, fruit 300, 409
 Ladder, step 235
 Lamp 156, 187, 199
 Lamp, brass and chandelier 300
 Lamp, brass, 225, 410
 Lamp, coach 23
 Lamp, coal oil 157, 300
 Lamp, petroleum 267
 Lampwick 408
 Lampers 12, 27, 109
 Last 208
 Latch, door 237
 Latch, knob 332, 348, 363
 Latch, lever spring 43
 Latch for railroad car doors 410
 Lathe attachment for turning tapers on bars 27
 Lathe, engine turning 410
 Lathe, turning 59, 156, 231, 317
 Lathe, turning, rest for 45
 Lead pencil, machine for cutting 12
 Lead process of separating silver and gold from 343
 Leather cloth, imitation leather, &c., manufacture of 317
 Leather, composition for treating 187
 Leather, machine for cutting, into counters 219
 Leather, mode of connecting two or more pieces of, together 11
 Leather, sweat, ventilating, for hats and caps 239
 Leather, tanning 75
 Leather-preserving machine 267
 Log, artificial 251, 268, 288, 284, 364
 Lenses, achromatic 237
 Lever jack 347
 Life boat, submarine vessel and 234
 Life-preser, brakeman's, for railroad cars 190
 Light, artificial, means of rendering, the same as daylight 76
 Lightning conductor 75, 316
 Liniment 43, 140
 Links for steam engine, improvement
 Liquids, alcoholic, apparatus for concentrating and analyzing 333
 Liquids, apparatus for cooling 251, 259, 333
 Liquids, apparatus for drawing 346, 384
 Liquids, injector for heating 108
 Liquids, saccharine, machine for evaporating 267
 Liquids, still, bottling 396
 Liquor, a.mal., apparatus for fermenting 109
 Lock 44, 59, 125, 157, 203, 236, 316, 346
 Lock, jail doors 237
 Lock, hoop, for casks 59
 Lock, hoop, clasp for 59
 Lock, metal, for wooden hoops for casks 77
 Lock, percussion, for discharging min-
 ing blasts 267
 Lock, row or scull 221, 226
 Locks, safety-guard for 187
 Locks, trunk, haps for 190
 Locomotive 188
 Locomotives for railroads, constructing and operating 332
 Log, wood 14, 204, 347
 Loom 140, 205
 Loom, circular 317
 Loom for weaving palm-leaf, straw, etc. 349
 Loom, power, 12, 76
 Loom, power, lot of motion of 28
 Looms, shuttles for 141, 156
 Looms, shuttle guide or guard for 140
 Looms-inches in, device for supplying wft to 61
 Looms, take-up motion for 140, 189
 Looms, yarn-beam of, friction device for the 155
 Lubricator 27, 140, 187, 396
 Lubricator, axle, for carriages 220

M

Magnesium, manufacture of 395
 Marble, tool for graining 28
 Maze, barley, &c., process of treating, for manufacture of alcohol 61
 Manger 348, 365
 Manner, manufactory of 191
 Mangle, machine for cutting 28
 Mattress, spring 231, 332
 Mattresses, spiral springs for, bracing and fastening 300
 Mattresses, treating moss for 186
 Measure, number 124
 Measure, spring tape 307
 Meate-broiler 187
 Meate-cutter 44
 Meate-cutting machine 60
 Meate, process for preserving 59
 Medals, pin fasteners for 249
 Medical compound 219, 409
 Medicine chest 390
 Medicine for cure of diphtheria 219
 Medicine for cure of scurifatia, sore throat, etc. 140
 Melon-skins, attaching keys to 43
 Metal, fusible, for filling teeth 220
 Metal, molding of 186
 Metal sheet, machine for cutting 251
 Metal vessels, soldering 364
 Metal ware, sheet, machine for making 344
 Metallic substances, preparing, for en-
 capping 188
 Metallic surfaces, mode of uniting 331
 Metals, mode of coating and bronzing 61
 Meters, water 235
 Mildew, mode of preventing, in canvas, cloth, etc. 11
 Mill, equipping the temperature of 140
 Mill, machine 123
 Mill, bark 284
 Mill, elder 11, 44, 109, 268, 235
 Mill, centrifugal crushing 365
 Mill, chasing 219
 Mill, grape 364
 Mill, grinding 124, 187, 331, 332

N

Nail machine 27, 288
 Nails, boot and shoe 203, 316
 Nails for leather work 234
 Nail, spinning and other, loom for making 141
 Nail, machine for cutting threads in 381
 Nails, machine for finishing 300
 Nails, machine for making 380, 410
 Nails, machine for tapping 346

O

Odometer 364
 Oil, compound 347
 Oil, hydro-carbon, distilling 199
 Oil, hydro-carbon, refining 27, 237
 Oil, mineral, apparatus for purifying 340
 Oil, paint 219
 Oil, petroleum and other, refining 261
 Ordinance 190, 203
 Ordinance, attaching trunnions to 107
 Ordinance, breech-loading 27, 28, 44, 60, 93, 230, 317
 Ordinance carriage for raising and trans-porting 233
 Ordinance exhausted of air, tompon cap for 347
 Ordinance, loading 28
 Ordinance, pendulum sight for 331
 Ordinance projectiles, sabots for 347
 Ordinance, provisior, for recoil of 43
 Ordinance, rifled, packing projectiles for 364
 Ordinance, rifled, projectile for 140
 Ordinance, strengthening 77
 Ore crusher 300, 332, 336
 Ore roaster 294
 Ores, apparatus for roasting and reduc-ing 191
 Ore, desulphurizing 28, 3, 332
 Ore, hydraulic machine for washing 58
 Ores, mill, etc., machine for concen-trating dust of 33
 Ores, mode of extracting gold and silver from 365
 Ores, mode of preparing 347
 Ores of gold and silver, apparatus for roasting and treating 281
 Oval, machine for cutting 141
 Ox shoe 77
 Oyster tongs, working 268
 Oysters and fruit, apparatus for pre-serving 220

P

Packing, fibrous, for steam engines 280
 Packing, piston 136
 Packing piston, mode of lubricating 35
 Paddle, lever 12
 Padlocks 234
 Paging machine 237
 Paint, composition for 156, 202, 320
 Paint, vehicle for mixing 409
 Paint evaporating, for sugar and syrup, 11, 26
 Pan, frying 220
 Pan, frying, and kettle 186
 Pans, sheet metal, machine for making 379
 Pans, sheet metal, machine for raising 331
 Panion logs, device for preserving shape of 189
 Pantaloons, apparatus for stretching 76
 Paper, cutting and twisting 141
 Paper, drying cylinder for 281
 Paper, implements for perforating and sewing 23
 Paper for telegraphic purposes, machine for punching 77
 Paper gun or adhesive 109
 Paper hangings, apparatus for trimming 24
 Paper-making machine 364
 Paper-making machine, self-acting felt-guide for 26
 Paper, manufacture of 160
 Paper-ruing machines 365
 Paper-pulp, manufacture of 305
 Paper-pulp, mode of treating vegetable substance for the manufacture of 203, 410
 Paper twine, machine for cutting paper for 304
 Pavement, concrete, composition for 190
 Pavement, street, 236
 Pavements, composition for 207
 Pavement machine for roughening 107
 Pavements, roofing, etc., composition for 331
 Peach-parer 157
 Peat, machine for cleaning 299
 Peat, preparing, for fuel 220
 Peat, process for solidifying 251, 262
 Pegging machine 188, 209
 Pen, pencil holder 205
 Pencil 43
 Pencils, lead, machine for cutting 12
 Penmanship, diagram for teaching 269
 Percolator, adjustable 219
 Petroleum, etc., process for deodorizing
 Petroleum, process of treating 44
 Photographic albums, machine for cut-ting front cover of 304
 Photographic pictures, apparatus for ob-taining 12
 Photographic prints, cabinet for exhib-iting 190
 Photographic prints, apparatus for gum-ming, etc. 10
 Photographic prints, apparatus for washing and drying 266
 Photographs, apparatus for exhibiting
 Photographs on cards, apparatus for pasting 370
 Photographs, roller press for finishing 59
 Photo-galvanography 123
 Photo-sculpture 125
 Piano forte 232
 Piano forte action 60
 Pianoforte, portable 12
 Pianos, tension scale for tuning 107
 Pick 92
 Pick, mill 223
 Picket, corrugated fence 93

Piles, construction of, for wharves 25
Piles, mode of sinking 24
Pin, clothes 349, 410
Pin, diaper 139
Pin, hair 156
Pin, linch 219
Pins, pointing wire for 124
Pipe, cement, machine for making 220
Pipe cleaner, pocket 38
Pipe, confectioners, machine for making 100
Pipe, gas, and stair rods 59
Pipe, or smoking apparatus 235
Pipe, pocket tobacco 60
Pipe, pump 186
Pipe, steam, vessels 27
Pipes, smoking 44, 316
Pipes, smoking, oil cap on 186
Pipe-stopper, hawse for 124
Pipe, tobacco, 279, 397
Pipes, drain, flasks for 379
Pipes, etc., steam, composition for coating 291
Pipes, mode of attaching, to sinks 186
Pitta terra cotta, forming sockets on 345
Pipes, tobacco, stem of 24, 156
Pistol, breech-loading 13
Pitchfork 268
Plane, shoemaker's edge 189
Planing machine 284, 316
Planing machine, cutter arms for 220
Plane, grinding 364
Plane-holder, photographic, catch for a 222
Plates, chimney cap, fastening for 202
Plates, photographic apparatus for drying 268
Planter, corn 10, 75, 107, 108, 124, 186, 187, 201, 202, 206, 208, 209, 300, 315, 317, 331, 332, 365, 409
Planter, hoe and seed 187
Planter, seed 254, 363, 390
Planting, device for marking ground for 364
" and seed-sower combined 390
" and seed-sower combined 390
Plaw, corn 220, 231, 331, 332
Plaw, grain and seed 121
Plaw, rotating 156
Plaw, snow 221
Plaw, straw 189
Plaw, stable in stable, device for 409
Plowing machines 332
Plaw, stable-cleaner for 251
Portfolio 189
Port-ports of ships, device for securing 76
Post, fence 124
Post-horn, mode of preventing 265
Potato digger 218, 285
Potato masher 408
Potato-pot 109
Potatoes, machine for planting 190
Pottery wares, mode of molding and finishing 215
Powder, baking 409
Powder, fulminating, manufacture of 191
Power, churn 251
Power, motive, improvement in 232
Power, obtaining and transmitting 124
Preparation, water-proof 93
Press 301
Press, cloth 100
Press, cheese 410
Press, copying 12
Press, embossing and seal 236
Press, fruit and vegetable 284
Press, hand printing 333
Press, hay 59, 76, 225, 285, 300
Press, hydraulic 156
Press, power 124
Press, printing, apparatus for feeding paper to 317
Pressure, pneumatic apparatus for forcing water by 124
Printing, process of, from engraved plates 41
Projectiles, enameled 347
Projectiles, sub-caliber, jacket for 268
Projectiles, sub-caliber r fled 410
Propeller 60
Propeller, car 410
Propeller, hydraulic 233
Propeller, marine 208, 349
Preserves, apparatus for preserving 269
Pulverizer, cart 378
Pulverizing and levigating substances, machine for 236
Pump, 59, 123, 139, 205, 218, 220, 267, 300, 316, 338, 347
Pump, air 364, 379
Pump, bellows 228
Pump, castle 218
Pump, chain 12
Pump, double-acting 156
Pump, double-acting hollow piston 92
Pump, double-acting submerged 316
Pump, drill and land 348
Pump, fire 10, 107, 300
Pump, hydraulic 301
Pump, lifting 267
Pump, mercury-packed 157
Pump, oil well 205
Pump, railroad 251
Pump, rotary 10, 140, 348
Pump, steam 157, 251
Pump, test 269
Punch, adjustable gang 203
Punch for attaching buttons by rivets 284
Punch for cutting out welts of boots and shoes 28

Q

Quartz crusher 27, 187, 190, 205, 379
Quartz, stamping mill for 12

R

Radiator 125
Radiator, heat 409
Radiator, steam, air valves for 202
Radiator, steam-heating 202
Rack, clothes and hat 156
Rack, sheep 203, 237, 346
Rack, sheep, shed and fold, combined portable 348
Raff, 349
Rails, railroad 76, 252
Rails, railroad, fagoting 76
Railway, atmospheric 221
Rain spout 410
Rake for harvester 26, 234
Rake, hand, revolving 300
Rake, horse 108, 120, 157, 159, 220, 283, 348, 366
Range, cooking 188
Range, cooking and heating 333
Ranges, water-back for 186
Rasp, machine for cutting 124
Ratan waste, utilization of 204
Reaping and mowing machine 348
Reaper, reaping 316
Reef, fishing-lines 59
Reflectors, device for adjusting 283
Refrigerator 269, 379
Regulator and ventilator, draught 155
Regulator, automatic 316
Regulator, blast 140
Regulator, damper 409

Regulator, draft 189
Regulator, feed-water, for steam boilers 200
Regulator, heat 27
Regulator, radiating heat 202
Retorts, gas, composition for lighting 126
Rides, telescope sight for 188
Ring, lib sail 233
Rivets, machine for making 349
Rock-breaking device 253
Rod, metallic, device for cutting tenons on 100

Roller, stand 12
Roller, washing 26
Rollers, machine for fluting 253
Rolls, motion of, apparatus for reversing 38
Roofing apparatus 317
Roofing fabric 204
Roofing material 10
Roofs 300
Roofs of churches 301
Roofs, shingle, mode of protecting and repairing 268
Roofin, other substances, extracting, from pine wood 219
Rounding machine 157
Rounding, metal 316
Ruling machine 204
Ruling machines, adjustable atmospheric feeder for 332
Runner, removable, for carriage wheels 191

S

Sack-iron 409
Sack-iron, heating 60
Sack-iron water 220, 226, 228
Saddle, side 395
Safe 26
Safe, match 10
Sails, attachment of 236
Sails, rectangular furling 267
Sails, for eyes 238
Sash, attaching stops to 76
Sash-holder 316
Sash-stopper and lock 232
Saw and planing machines, feed-roller for 190
Saw-dressing machine 108, 251, 268
Saw-frame 342
Saw-mill 28, 109, 189, 190, 267, 284, 316
Sawing, boring, etc., machine for 348
Sawing machine 44, 108, 219, 223, 267
Saws, frames for 380
Saws, hanging circular 77
Saws, machine for grinding and polishing 317
Saws, planing 347
Scaffolding and elevating same 27
Scale-beam 59
Scissors 252
Scraper, road 156
Screen and sieve, grain 349
Screen, grain 261
Screen-door 140
Screen 363
Screw for music stools 235
Screw, rigging, for "burning in" dead-eyes 294
Screw-blanks, dies for heading 189
Screw-blanks, machine for making 366
Screw-cutting machine 347
Screw plate 418
Screws, force for driving 43
Screws, mode of forming 189
Screws, mold for casting ornamental heads to 203
Screws, wood, shaving the heads of 283
Scroller, water wheel, improvement in 293
Scrubber 202
Scrubber and mop 301
Seat for schools and public buildings 348
Seat, railroad car 251
Seat sower 236, 379
Seeder, raisin 396
Seeding machine 300, 396, 409
Seeding machine and cultivator 316
Separator, corn sheller and 235
Separator, grain 27, 43, 59, 60, 108, 124, 187, 349
Separators 202
Stop-motion 187
Stop-motion for knitting machines 36
Stopper, bottle 202, 311, 333
Stone 27, 204, 219, 232, 348
Stone, base-burning 220, 223
Stone, camp cooking 202, 267
Stone, coal 300
Stone, cooking 11, 12, 205, 235, 267, 380, 381
Stone, cooking, hearth of a 124
Stone, cooking, stove covers of a 125
Stone, cylinder 316
Stone, dining room 234
Stone, drum 186
Stone, gas 44, 220
Stone, heating 289, 302, 203, 236
Stone, furnace, heating 219
Stone, portable drying 219
Stone, parlor 204, 235
Stone, parlor cooking 220, 235, 301
Stone, reservoir 202
Stone, safety ship and car-heating 379
Stone, summer 364
Stone, vapor 11
Stone, vapor connection 236
Stone pipes, dampers for 190, 332
Strap for holding down pantaloons 109
Straw-cutter 12, 45, 123, 397
Street-sweeping and sprinkling machine 202
Strip, weather 45, 257, 356, 395
Strips, abaqueous 190
Stud or button, elastic 124
Stun cane, machine for stripping leaves from 10
Sugar, manufacture of 75
Sugar-balling apparatus 108
Sulky 157
Supporters, abdominal 365
Supporters, limb 251, 395
Switch, railroad 251
Switch stand and signal target 44
Switch, gag 283

Shuttle for machines for knitting looms 12
Shuttle, sewing machine 44
Shuttle for looms 10, 267
Shuttle, cotton ash 203
Shuttle, muslin 328
Signal, railroad 140
Signal tower 410
Silk, machine for stretching and glossing 187
Signa, tower 333
Silver, out of, process for amalgamating 190
Skirt, 202, 346, 364
Skirt, hoop 108, 301, 348, 406
Skirt, skeleton 218
Skirt-former, adjustable 43
Skirt-lifter, ladies' 78

Skirt-supporter, corset 380
Slate, artificial school 317
Sledges, 292
Sleigh runners, manufacture of 44
Smoke house 409
Smoke stack, locomotive 365
Smoker, cigar-shaped 156
Slicer, meat and vegetable 283
Slicer, bread 409
Slicer, vegetable 232
Snowshoe, hog 156
Soap, apparatus for crutching 191
Soap, apparatus for marbling 364
Soap, arsenical 59
Soap, bi-basic, manufacture of 60
Soap composition 365
Soap for cleaning harness 397
Soap, machine for cutting 300
Soaking process for leather 76, 306
Soaker, whip 60, 140
Soda fountain 109, 124
Soda water apparatus 12, 268, 316
Sole, machine for filling the 125
Sole-plate, metallic, for boots and shoes 68
Sole, machine for introducing pegs and cement into 187
Spark-arrestor 93
Spheres or balls, device for turning 141
Spikes, machine for making 108
Splints, machine for cutting 10
Splints, tool for driving 26
Spinning, machine for 58
Spinning frame, ring and traveller 10
Spinning frames, self-rolling spindle bolster for 332
Spinning frames, steps for the spindles of 205
Spinning, hand, machine 27
Spinning machine 10, 140, 218
Spinning machine, bearing for flyers of 381
Spinning machines, spindles of, apparatus for applying adhesive and lubricating material to 343
Spirit level 204
Spirits, good flavored, etc., process for the manufacture of 335
Spoon, machine for filling 59
Spoon, say 364
Spring 33, 395
Spring and barrel for time-keepers 45
Spring, car 27, 108
Springs, carriage 317, 364, 380
Spring, door 187
Spring, railroad car 187
Spring-rod, machine for drawing 347
Spring-rod 347
Stamp, ware, manufacture of 219
Stamp, adhesive postage and revenue 347
Stamps and dies for crushing quartz, "casting" 386
Stamps, postage and revenue, mode of cancelling 347
Stand, for drawing car 27
Stand, return 302
Starch, manufacture of 235
Stave-jointing machine 204
Staves, machine for cutting 305
Staves, machine for dressing 204
Staves, machine for sawing 232
Steam and hot air heating apparatus, combined 316
Steam apparatus for superheating 203
Steam blast apparatus 231
Steamer, vegetable 332
Steel, manufacture of 44, 75
Steel, process of tempering 141, 219
Steel plate 11
Steel plate heating 283
Steel plate, heating 283
Stitch for soles and vamps 218
Sewing horse 408
Stockings, knitted, apparatus for cutting out 124
Stocks for holding sheep, etc., 395
Stone-crushing machine 141
Stop-sock 202
Stop-motion, manufacture of 210
Stop-motion for knitting machines 36
Stopper, bottle 202, 311, 333
Stone 27, 204, 219, 232, 348
Stone, base-burning 220, 223
Stone, camp cooking 202, 267
Stone, coal 300
Stone, cooking 11, 12, 205, 235, 267, 380, 381
Stone, cooking, hearth of a 124
Stone, cooking, stove covers of a 125
Stone, cylinder 316
Stone, drum 186
Stone, gas 44, 220
Stone, heating 289, 302, 203, 236
Stone, furnace, heating 219
Stone, portable drying 219
Stone, parlor 204, 235
Stone, parlor cooking 220, 235, 301
Stone, reservoir 202
Stone, safety ship and car-heating 379
Stone, summer 364
Stone, vapor 11
Stone, vapor connection 236
Stone pipes, dampers for 190, 332
Strap for holding down pantaloons 109
Straw-cutter 12, 45, 123, 397
Street-sweeping and sprinkling machine 202
Strip, weather 45, 257, 356, 395
Strips, abaqueous 190
Stud or button, elastic 124
Stun cane, machine for stripping leaves from 10
Sugar, manufacture of 75
Sugar-balling apparatus 108
Sulky 157
Supporters, abdominal 365
Supporters, limb 251, 395
Switch, railroad 251
Switch stand and signal target 44
Switch, gag 283

Table and seat, school 300
Table, folding 69
Table, kitchen, and toilet glass 233
Table, supplemental, for book-binders 44
Tables, extension, side for 189
Tack-hammer and carpet-stretcher 27
Tackle, fishing 108
Tackles, folded, machine for making 237
Tanning 28
Tanning apparatus 124
Tanning, composition for 19
Tanning, properties, mode of extracting, from bark 409
Teeth, artificial 28
Telegraph, fire-alarm 379
Telegraph wires, insulator for 379
Telegraph instrument 316
Telegraph, lightning arrester for 12
Temperature, subzeroes 45
Temperature, a uniform, means of securing, in buildings 204
Template, adjustable 284
Thill, attachment or coupling 349
Thimble with guarded cutters 188
Thread, waxed, device for heating, in sewing machine 187
Thread and separator 12, 221
Threshing machine 206, 294
Ties, railroad, preserving 10
Tile machine, improved 202

Timbers, fastening 108
Tire, improved device for shrinking 202
Tire or hoop bender 11
Tires, steel, mode for casting 220
Tires of wheel carriages, tightening 28
Toaster or boiler, wire 267
Tobacco cutter 379
Tobacco, cutting and pressing 235
Tobacco leaves, reducing stems of 140
Tobacco, machine for dressing 332
Tobacco, packages of, machine for making 187
Tools, depthing 306
Tools, edge, grinding 60
Torpedo, method of applying, for harbor defense 10
Toy, 100, 124
Tran, animal 43, 202, 233, 284, 379, 409
Trap, fly 237
Trap, steam 409
Tree, protector 190, 204, 268, 348
Trough, eaves, finishing 267
Truck, car 269
Truck, car, side box for 347
Truck, car, trucking 28
Truck, dummy locomotive 11
Truck, locomotive car 109
Trunk 331
Trunks, case for 269
Truss 75, 204, 317, 379
Tub, cooling, for water and beer 89
Tub-washing machine, improved 202
Tubular, flexible, device for making curves in 379
Tubing, spiral, manufacture of 348
Turpentine, distilling from wood, 236
Tuyere 77, 107, 316
Twine cutter 235
Types, machine for cutting printers' 93, 396

U

Umbrella 124, 237
Urinal 395

V

Valve, balance steam 209
Valve, balanced slide 315
Valve, cut-off 27
Valve, cylindrical steam 139
Valve for steam engines 43, 156

Valve, gas regulating 408
Valve, governor 76
Valve, governor, cut-off 156
Valve, oscillating 379

Valve, rotary steam 156
Valve, self-regulating pressure 140
Valve, slide 235
Valve, slide, for steam engines 267, 301

Valve, stop 11
Valve, water closet 363
Varnish, picture 258

Vegetable material, process for removing mineral, gummy and resinous substances from 284
Vegetable, water closets 284

Vernier, treating gum for manufacture of Vegetable material, process for removing mineral, gummy and resinous substances from 284

Vernier, treating gum for manufacture of Vegetable material, process for removing mineral, gummy and resinous substances from 284

Vernier, treating gum for manufacture of Vegetable material, process for removing mineral, gummy and resinous substances from 284

Vernier, treating gum for manufacture of Vegetable material, process for removing mineral, gummy and resinous substances from 284

Vernier, treating gum for manufacture of Vegetable material, process for removing mineral, gummy and resinous substances from 284

Vernier, treating gum for manufacture of Vegetable material, process for removing mineral, gummy and resinous substances from 284

Vernier, treating gum for manufacture of Vegetable material, process for removing mineral, gummy and resinous substances from 284

Vernier, treating gum for manufacture of Vegetable material, process for removing mineral, gummy and resinous substances from 284

Vernier, treating gum for manufacture of Vegetable material, process for removing mineral, gummy and resinous substances from 284

Vernier, treating gum for manufacture of Vegetable material, process for removing mineral, gummy and resinous substances from 284

Vernier, treating gum for manufacture of Vegetable material, process for removing mineral, gummy and resinous substances from 284

Vernier, treating gum for manufacture of Vegetable material, process for removing mineral, gummy and resinous substances from 284

Vernier, treating gum for manufacture of Vegetable material, process for removing mineral, gummy and resinous substances from 284

Vernier, treating gum for manufacture of Vegetable material, process for removing mineral, gummy and resinous substances from 284

Vernier, treating gum for manufacture of Vegetable material, process for removing mineral, gummy and resinous substances from 284

Vernier, treating gum for manufacture of Vegetable material, process for removing mineral, gummy and resinous substances from 284

Vernier, treating gum for manufacture of Vegetable material, process for removing mineral, gummy and resinous substances from 284

Vernier, treating gum for manufacture of Vegetable material, process for removing mineral, gummy and resinous substances from 284

Vernier, treating gum for manufacture of Vegetable material, process for removing mineral, gummy and resinous substances from 284

Vernier, treating gum for manufacture of Vegetable material, process for removing mineral, gummy and resinous substances from 284

Re-issues.

Air, apparatus for combining hydro-carbon vapor with 349

Bathing apparatus, electro magnetic 29

Bell canopy 333

Belt measure 301

Boots and shoes, trimming the heels of 141

Buckle 13

Button-holes, apparatus for cutting 61

Cars, railroad, mode of operating brakes of 233

Cans, cases, etc., metal 317

Chair, arm, folding 45

Chair, folding 188

Cigar machine 188

Clothes, machine for wringing 29

Collar, shirt 381

Compost for water-proofing and coating fabrics 45

Cutter, straw 301

Door knobs, mode of attaching, to spindles 13

Dove-tailing, miter, machine for 188

Eyelet machine 77

Fertilizers, machine for sowing 45

Fire-arm, breech-loading 45

Fire-arm, revolving 141

Fire-arms, revolving, base-pin and lever of 233

Fire extinguisher 288

Flax, fibers of, cleaning and separating 205

Food, articles of, mode of deacating 188

Gas-pipe fittings, machine for finishing 236

Generator and radiator, furnace or heat 237

Guns and gun towers, operating 333

Horse-shoe 269

Horse-shoes, machine for making 381

Hut, portable 157

Inkstand, barometer 349

Knitting machine 301

Lamp 124

Lath, splitting machine 205

Leg, artificial 61

Lock, 51, 333

Mattress, stuffing for 188

Metal, machine for boring 205

Mill, cider 269

Needles, knitting, machine for making 349

Oar 205

Oil, apparatus for forcing, from oil wells 206

Ordnance, rifled, packing projectiles for 233

Ordnance, rifled, projectiles for 233

Petroleum and other hydro-carbons, mode of burning 233

Planofor 237

Plow, direct-action, steam 77

Rake, horse 397

Rake, revolving 93

Reaping machine 45

Regulator and ventilator, draught 141

